The Chemical Age

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Science and Fuel

THE report of the Fuel Research Board contains many subjects of interest to chemists. Coal owners have now been driven to face the basic fact that unless they supply to their customers coal suited to the needs of the user, other fuels will make still greater inroads upon coal markets. Thus is springing into being the practice of breaking coal for the market, and grading the broken coal to exact sizes. How can it be guaranteed that, in breaking, the maximum of the sizes required will be obtained, and the minimum of slack? There is a pretty problem for the physicist. It seems inevitable at present that increasing quantities of slack coal will be thrown on to the market—a fact that may well be borne in mind by those who are installing new plant requiring heat. We read recently in a German technical paper of a new pipe still tar plant that is heated by dust coal containing 20 per cent. of ash—locally regarded as a waste product. The laws of coal breaking are still imperfectly understood, and are likely to remain so since each coal differs in some way from all other coals. It seems from the work of the Fuel Research Board, however, that if the broken coal is subjected to sufficiently rough handling at the colliery after breaking, no further degradation occurs in transit so that the consumer actually receives coal of the size at which it leaves the screens.

Coal is frequently freed from the major portion of its ash by pulsating it in water, and this was for years an unsatisfactory process because fine particles of coal and ash remained suspended in the water, even after long standing, and seriously interfered with the process. The physical chemist has stepped in, however, and coal slurries, as they are termed, were treated as colloidal suspensions, to be flocculated by neutralisation of the electric charge on the particles by an opposite charge from a flocculator; most of the suspended matter, however, is very much above colloid size—even up to 0.25 mm. diameter. It has been found that even this comparatively large—but nevertheless slow-settling—material can be flocculated by using the lyophilic colloid type of flocculator (*e.g.*, starch and glue), but not by electrolytes. The precise action seems a little obscure, but apparently neutralisation of electric charges is not what occurs; certain slurries, not otherwise amenable to flocculation, have been neutralised by minute quantities of wetting agents, or other surface activating solutions. This is another pretty problem for the physicist.

Some interesting work has been done during the year, largely under Professor Rideal at Cambridge, upon catalysts. The rapid deterioration of the catalyst used in the semi-large scale continuous hydrogenation convertor for tar—the development of which has been one of the triumphs of the Fuel Research Board—necessitated the investigation. Due either to crystallisation or to deposition of matter upon the catalyst, the useful life of these bodies was to be measured in minutes; research has extended this period of useful life to four to six weeks. X-ray diagrams have shown that heating causes the molybdenum sulphide catalyst generally used at the Fuel Research Station to increase in particle size, with a consequent decrease in surface area and loss of catalytic activity. Attempts have been made to prevent this action by addition of promotors. A particularly effective method has been to prepare the catalyst from the appropriate heterpoly acid, with the promotor as the central atom in the complex. Two series of catalysts of this character have been investigated and it is of great interest to observe the entirely different behaviour of apparently related materials. In one series with 12 molybdenum atoms to each atom promotor, the efficacy of the promotor appears to depend upon the prevention of sintering of nearly amorphous catalysts; in the other series with six molybdenum atoms to each promotor atom the efficacy of the promotor is due to disturbance in the catalyst space-lattice by the entry of the promotor.

One of the primary problems of the Fuel Research Board is to find a method of producing lubricating oils from indigenous sources. The polymerisation of ethylene is under investigation for this purpose and it has been found that, although no satisfactory lubricating oils have been produced as yet, the character of the polymerisation product can be profoundly modified by choice of catalyst and by alteration of the operating conditions. It appears from this as a general principle that chemists are only at the beginning of the possibilities of catalysts in general and even their best understood reactions may be found capable of yielding new products by a re-investigation of catalyst and conditions. It is perhaps not surprising that the Board is beginning to wonder if the Fischer-Tropsch process will not be the solution to the lubricating oil problem. It may also be the solution to the fuel oil and petrol problem. First of any chemical paper, we were able to announce in these columns that arrangements were being made to develop the Fischer-Tropsch process in this country. Those arrangements have come to fruition and a British company is now in a position to erect plants. It would seem that the less the time which is allowed to elapse before a plant is erected, the better; we shall then know if this purely chemical process has valuable applications in this country.

Notes and Comments

Trade and The Crisis

THE domestic crisis through which the nation has been passing has been lamentable in many ways. Fortunately the uppermost feeling has been one of bewilderment rather than of panic, and this has been notably the case with the business community. Suddenly faced with an unprecedented crisis affecting the King, the Governments of Great Britain and the Dominions overseas, and the succession to the Throne, the City of London had a set-back, but quickly recaptured most of its lost position. The chief problem presented to the commercial community was the uncertainty attaching to Coronation lines of all sorts. While this has proved temporarily embarrassing in more than one trade, an observer taking the widest possible view can come to no other conclusion than that its effects have been incidental and patchy. In fact, the broad basis of industry and commerce has not been affected. British constitutional processes are proving themselves so sound in this grave emergency that, with the passing of its personal and psychological factors, there will remain a permanent feeling of satisfaction that an unexampled crisis failed to shake the Empire's prestige or its material progress.

Thirty Million Bowler Hats

IN the opinion of Lord Halsbury it is "absolutely and completely true" that the thirty million gas masks which are to be issued to the civil population for use during poison gas attacks from the air in the next war—the war that we hope will never come—will be no more use than thirty million bowler hats. The design of these masks is claimed to be based on many years' intensive scientific investigation, but we have to remember that it is impossible to design any effective gas mask unless we know the gases against which we seek protection, and nobody knows what gases will be used in the next war. "Need I say more about gas masks than that they are absolutely broken reeds," remarked his Lordship in raising the question of protective measures in the House of Lords last week. Making a statement on behalf of the Government, Lord Dufferin and Ava invited Lord Halsbury to take any gas he had in mind to the Air Raid Precautions Department, where it would be put through the most difficult tests possible. The House was also told that the respirators of which the efficiency was questioned would provide protection against any known form of gas, and that "the precautions taken would make a gas attack so unlikely to succeed that no power would attempt it." If the latter statement is true, obviously we need not worry about the "bowler hats," but criticism of their efficacy still persists. Professor J. R. Marrack, professor of chemical pathology at London University, told a meeting of the Abyssinia Association in London on Monday that the promised civilian respirators have only a tenth of the protection the soldiers had. "We cannot guarantee that they will protect you against a very strong concentration of gas, or against arsenical smoke which cause intense distress and make people pull their masks off," he said. "A child under five cannot wear a gas mask because it cannot overcome the resistance to breathing."

When Depression Comes

QUITE apart from defence work, Imperial Chemical Industries, Ltd., are very busy commercially; so busy that over the past few months the directors have authorised very large capital expenditure. But recession of trade is inevitable; the upward trend cannot go on for ever. Before leaving for his Australasian tour Sir Harry McGowan told the central council of the company that he thought perhaps they might have two or three years of very good trade ahead of them, but during that time the company must consolidate its position. It must make inefficient plant efficient, because when the depression comes, as it will, it must have a lowest operating costs possible. It is the policy of the company to pass on economies that it makes in its manufactures, as far as it possibly can, to those who buy its goods. That is not disinterested. The aim is to make customers competitive. If they are not, then they lose business to other countries, and I.C.I. loses that volume of business. "I am sure you will agree with me," said Sir Harry, "that over the next two or three years we must become more efficient. If we are wrong it is all to the good. I am not saying for a moment that we think any particular group or any particular factory is inefficient; we are delighted with the technical efficiency, but 'divine discontent' must be our slogan." In the course of his speech Sir Harry McGowan also touched on the political situation, and hinted that in the course of time the company would be asked to do work of a gigantic nature to assist in putting the country in the position in which it ought to be placed at the earliest possible moment.

Psychology in Industry

THE National Institute of Industrial Psychology, which numbers among its council members many of the leaders of the chemical industry, has issued its sixteenth annual report, reviewing typical investigations carried out for industrial firms during the past twelve months. The report emphasises the increasing attention being paid to problems of morale and factory "atmosphere." The worker's attitude towards his work and towards his supervisor is more important than any other single factor in production. When the worker is able to some extent to identify himself with his work and with the firm that employs him, when he feels that his work is of value; when he works under a supervisor who is just as sympathetic; when he is reasonably secure in his employment, and feels that he will get a "fair deal" from the management; then, and only then, is he likely to do his best—and may indeed achieve high efficiency even under physical conditions that are far from perfect. When, on the other hand, he believes, rightly or wrongly, that the management are concerned merely with profits and care nothing for the worker as an individual; when he is on bad terms with his supervisor; when he feels that good work is unappreciated, promotion going by favouritism and dismissal by prejudice; when he is harassed by a sense of insecurity or injustice; then he will be unhappy and inefficient, and the strictest discipline, the most elaborate of bonus schemes and the best welfare services may count for little or nothing.

Some Problems of the Petroleum Industry

By J. E. WALKER

OF the many problems always confronting the petroleum industry, none are more complex than those in the chemical section. Deterioration of petrol during storage, for instance, presents us with two very difficult problems; the formation of gum, and loss of good colour. Deterioration occurs most readily in blended fuels and cracked spirits, and is becoming an increasingly important problem, since high-compression engines make the use of such fuels almost compulsory. Straight-run petrols as previously used will not suffice, and use is made of cracked spirits, motor benzole, and to some extent, alcohol; all of which have high octane values. Blends of these with petrol give highly satisfactory performances, but the gum and colour danger is a decided menace.

The Chemistry of Gum Formation

What is known as existent gum is nearly always present in refined petrols, but to such a small degree that it is usually of little importance. The great danger comes from certain unsaturated and unstable compounds found in cracked spirits, *e.g.*, di-olefines, which during storage undergo oxidation, and produce what is known as "potential" gum. These unsaturated compounds can be removed by acid refining, but the treatment has to be so drastic that many aromatic compounds are also destroyed, hence seriously lowering the octane value of the petrol. If this heavy refining is not carried out, gum will probably form; if it is, the resultant petrol will require blending with benzole, alcohol or some "dope," *e.g.*, lead tetraethyl. The second method is usually impracticable, and the first method again involves gum formation, as stable petrols sometimes deposit gum on being blended with either or both alcohol or benzole, as these two substances seem to act as gum accelerators under certain conditions. During transport and storage, oxygen (*i.e.*, air) is always available, and in addition petrol contains a certain amount of dissolved air; hence oxidation will almost surely take place, particularly in the summer when higher temperatures prevail.

The chemistry of gum formation is imperfectly understood, and it is here that research work will probably overcome the difficulties. The reaction would appear to involve the initial formation of aldehydes and peroxides, further oxidation producing a mixture of these with alcohols, ketones and organic fatty acids. The resulting complex substance is hard and resinous, sometimes soluble, sometimes insoluble in the petrol, and can be removed by re-treating. Here then is our problem. Can a method of refining be found which will remove unsaturated gum-forming hydrocarbons from a petrol and yet leave the aromatic high-octane hydrocarbons untouched? No method yet adopted is satisfactory and a great deal of research work would appear to be necessary.

There is another approach to the solution of this problem and that involves the use of an anti-oxidant "dope." Many substances, such as thio-urea, naphthol, hydroquinone, phenol, carbazole and stannous chloride, have been tried in order to prevent oxidation, and hence gum formation. Many of these have been found quite successful for some particular petrol, but none has been found to be universally suitable. Could some volatile substance be found, which, added in small quantities to petrol, would definitely prevent gum-formation, a great problem would have been overcome.

Colour Deterioration

A problem closely connected with gum formation is that of colour deterioration. Many petrols, particularly cracked and blended spirits, turn brownish-yellow during storage. This colour change is due to oxidation and may be accompanied by gum formation, in which case both problems can be regarded as one. Frequently, however, no gum is formed when the spirit darkens, and the refiner is then faced with the problem of yellow spirit, in itself unsatisfactory, but almost unsaleable. Therefore, he must refine the spirit a second time, an expensive business, or he must use a dye and sell a coloured spirit. Some form of anti-oxidant is urgently required here, and of quite a different nature from that required in preventing the formation of gum.

Another ever-present problem is the production of high-octane motor fuels, to meet constantly improving engine design. Cracked spirits, benzole and alcohol blended with straight-run petrol, give very satisfactory results up to a point, but the old gum and colour oxidation problems crop up again, and in addition, benzole and alcohol cannot be used in sufficient quantities to raise the octane number of a fuel much above eighty. Aviation fuels (and soon general purpose fuels) demand anything from ninety to a hundred as the octane number, hence recourse is had to dope, *e.g.*, tetraethyl lead.

Straight-run petrol with tetraethyl lead forms most satisfactory fuel, as there is no tendency to gum. Unfortunately, another problem presents itself. The only economic method for the production of lead tetraethyl is held under patents in America. This definitely prevents many would-be users from obtaining supplies. Other substances have been tried, such as iron and nickel carbonyls, iron acetyl acetonate, organic iron and copper compounds, but without real success, the best being some forty times less efficient than lead tetraethyl.

Search for a Suitable Dope

"Knocking" in an engine would appear to be due to the formation of peroxides in the combustion space during the early part of the engine cycle, and later these unstable compounds violently decompose. Therefore, we have a third problem in some way connected with oxidation. Possibly, all could be solved by the discovery of some suitable dope. The fact remains that could such a dope, or series of dopes be produced, it would be of inestimable value to the British petroleum industry.

Another problem, the solution of which would make Great Britain independent of imported Diesel fuel, is a satisfactory "dope" for fuel produced from coal. The charge in a Diesel engine is fired by the heat generated during compression, and ease of starting and economical running, together with good power output, seem to be dependent on the low spontaneous ignition temperature of the fuel. Petroleum Diesel oil has a low S.I.T., while coal-produced Diesel fuel has a high one. Therefore, some substance must be added to lower it, and many such have been tried.

Whereas petrol dopes prevent auto-ignition and raise spontaneous ignition temperatures, Diesel fuel dopes must have an entirely opposite effect. Hence easily decomposed, and in some cases even explosive substances have been used with varying degrees of success. Ethyl nitrate has proved most satisfactory, but has to be used in such quantities that it lowers the flash-point of the fuel below specification limits. Other compounds tried include various chlorates, organic perchlorides, copper acetylide, mercury fulminate, picric acid and trinitrotoluene. Certain nitrated chlorohydrins have recently been investigated, and have proved very successful, but economical production has here proved a difficulty. A suitable substance must be cheap, non-corrosive and neither lower the flash nor raise the viscosity of the fuel to which it is added. Yet it must lower the spontaneous ignition temperature. At present, no satisfactory compound is known.

The Problem of Acid Sludge

Lastly, there is the problem of acid sludge. When petroleum products are acid-refined, the disposal of waste sludge provides many difficulties. This sludge varies from a thin, mobile liquid to a practically solid, asphaltic substance.

The thinner sludges are more easily dealt with, as acid of fair quality can be recovered from them, and the residue burnt.

Little at present is done with the more solid sludges, except to use them as fuels, and this would appear to be a great waste of a potentially valuable substance.

Acid-sludge is probably as complex a substance as coal-tar and when thoroughly investigated may prove as valuable. Large quantities of sulphonic and naphthenic acids are already obtained from sludge, but this would seem to be the extent of recovery. After neutralisation, the asphaltic portion is sometimes used as a cheap form of asphalt, but it is to be hoped that research will soon prevent this waste. At present, no really satisfactory method of either disposal or utilisation is known, and much useful knowledge should be gained by thorough investigation. As an example, during recent refinery work, a most interesting point was noted. A hard acid sludge, when moist, is almost as slippery as ice, while a clear asphalt with low sulphur content is not. Now acid sludge contains a high proportion of good quality asphaltum, but its many acidic and sulphurous impurities appear to cause this slippery surface. The question is therefore raised whether, when inferior asphalts, containing large amounts of sulphur, are used on the roads, moisture slowly reacts with the sulphur, forming acidic bodies, *e.g.*, sulphurous acid, and forms this slippery surface on our roads.

Here then is just a brief summary of a few of the most pressing problems of the petroleum industry. They offer a varied field to the investigator, and successful solution of any or all would be of extreme importance, not only to the industry, but also to this country.

Ramsay Chemical Dinner

Lord Leverhulme as Guest of Honour

LORD LEVERHULME, president of the Society of Chemical Industry, was the guest of honour at the annual Ramsay Chemical Dinner, attended by representatives of all the principal chemical organisations, at the Central Station Hotel, Glasgow, on December 4. Professor G. G. Henderson, of Glasgow University, a past president of the Chemical Society, presided, and other guests included Dr. R. H. Packard, president of the Institute of Chemistry. The memory of Sir William Ramsay was honoured in silence.

Professor G. G. Henderson, who presided at the Ramsay Chemical Dinner.

Lord LEVERHULME, who proposed the toast of "The Profession of Chemistry," said Sir William Ramsay little realised when he startled the scientific world with his discoveries of the rare gases of the atmosphere and laid bare the existence of a new group of elements that one of them, neon, would one day brighten our cities with lavish displays of coloured lights and give to industry a new and striking medium of advertisement. To the layman chemistry appeared to-day as a sort of auxiliary to nature, aiding her to be both more abundant and more diversified in her gifts. Nature was certainly very abundant, but she was not always very obliging. She was sometimes so reluctant to give up her treasures that the cost of wresting them from her was prohibitive.

Lord Leverhulme, President of the Society of Chemical Industry, the Guest of Honour.

It had been left to the chemist to assist and sometimes to produce synthetically substitutes for materials in respect of which nature had failed to observe the cardinal rule of marketing, which was to provide the right goods in the right place at the right price in the right quantities and at the right time. It was becoming clear that the economic difficulties which beset the present age arose not from inability to manufacture goods or to produce services, but simply because we had not yet learned how best to get these goods and services to the ultimate consumer.

The reasons for that were many, but there was one in particular which he would impress upon them that night. Our knowledge as to why goods were consumed was still very imperfect. It was as important for the young chemist to know the main trends of industrial development as it was for him to know the most recent developments in chemistry, for only thus could he reasonably hope to enter that section of industry which held out the most promise of an expanding demand for his services.

It might be argued that the chemist by reason of his steady stream of new discoveries was automatically creating fresh demands for his services in those industries which would avail themselves of his new discoveries, but that in no way invalidated his contention that a new discovery was by itself of no value to a chemist unless he had some idea of the economic conditions which were going to determine its value to industry.

Dr. R. H. Pickard, president of the Institute of Chemistry, responded.

Professor Henderson, in proposing the toast of "The Lord Provost," said that the Corporation of Glasgow had done a great service in purifying the River Clyde. There remained, however, a matter which the Corporation might undertake with great advantage to the community, and that was the prevention of the pollution of the air. The Corporation had certainly done something in providing gas and electricity at a moderate cost, but that was not enough. What was wanted was a smokeless fuel that could be burned in an open grate and provided at a moderate cost. That could be done; and he invited the Lord Provost's attention to that very pressing problem from a point of view of health. It might mean that some of them would have a longer life than they at present enjoyed.

The LORD PROVOST (Mr. John Stewart), in reply, said that the Corporation was doing all it could to induce the people of Glasgow and the manufacturers in the city to use materials which would not create the fogs to which the city was accustomed.

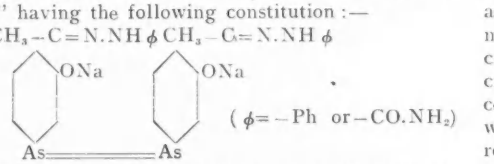
Mr. F. D. Mills proposed the toast of "Our Guests," to which response was made by Dr. Robert Robertson, the Deacon-Convener.

Organo-Metalloid Compounds—I*

By SUDHIRCHANDRA NIYOGY

(Department of Applied Chemistry, University College of Science and Technology, Calcutta)

UNTIL recently, it was assumed that for the preparation of an active trypanocide (among arsenicals) the structure of the compound must correspond to the salvarsan type, *i.e.*, the compound must be derived from 3-nitro-4-hydroxy-phenylarsenic acid. In fact, any deviation from this type was attended with diminished activity or increased toxicity. It has been recently demonstrated by Albert[1] that compounds having no similarity to salvarsan in structure, may also possess trypanocidal activity not inferior to salvarsan or its allied products. The substance in question is known as "Albert 102," having the following constitution :—



The substance thus appears to be a semicarbazone or phenylhydrazone of the corresponding ketone. That either of these groupings may have any effect in the appearance of trypanocidal properties in an arsenical, is noticed for the first time in "Albert 102." The function of the hydroxyl group might be to render the product capable of forming soluble salts, since it has been found that acetophenone-4-arsenic acid has a therapeutic activiay between 4 and 6.

As in the case of the trivalent arseno-compounds, the presence of amino and hydroxyl groups in particular positions were considered essential, so also in the case of the stibinic acids employed for the treatment of Indian Kala-azar, it is still maintained that therapeutically active compounds must be derived from 4-aminophenylstibinic acid. But considering the case of "Albert 102," the preparation of the corresponding stibinic acid was undertaken to find whether it exhibits any activity or not; since, however, the trivalent stibino-compounds are very unstable, the true antimony analogue of "Albert 102" could not be prepared, the corresponding stibinic acid being the final product of this investigation.

Preparation of Semi-carbazone

For the preparation of semi-carbazone or acetophenone 2-hydroxy-4-stibinic acid, an attempt was first made to prepare 2-hydroxy-4-aminophenyl methyl ketone by the nitration of 4-acetylaminoacetophenone in sulphuric acid solution with nitric acid (d 1.40) but unfortunately this scheme could not be worked upon, as the isomeric 2-nitro-4-acetylaminoaceto-phenone, which were produced simultaneously, could not be separated.[2] The method that was finally adopted for the preparation of the required compound consisted in the preparation of 4-acetylaminoacetophenone[3] with some modification. Kunchell[3] (*loc. cit.*) employed acetylbromide, acetanilide and aluminium chloride. We substituted acetyl chloride for the bromide and succeeded in getting an excellent yield by adding the acid chloride to a mixture of acetanilide and aluminium chloride in dry carbon disulphide.

When, however, aluminium chloride was added gradually to a mixture of the acid chloride and acetanilide in carbon disulphide, the reaction did not take place, and unchanged acetanilide was obtained at the end of the operation. 4-Acetylaminoacetophenone was then hydrolysed and the free amine diazotised in hydrochloric acid solution and treated with a solution of antimony trichloride in hydrochloric acid. It is generally found that an additive compound of the diazonium chloride and antimony trichloride separates at once but in this case the additive compound was found to be rather soluble in hydrochloric acid and the concentration of the acid was carefully regulated so that no antimony oxychloride separated.

After the usual alkaline decomposition of this additive compound at a low temperature, the free stibinic acid was isolated by acidifying the reaction liquid with dilute sulphuric acid (the stibinic acid is soluble in acetic acid). Acetophenone-4-stibinic acid (sodium salt) was dissolved in formic acid solution or in a mixture of acetic acid and formic acid[4] and slowly added to concentrated sulphuric acid at 0–0.5° and then nitrated as usual. The nitrated product was collected as usual by diluting the acid solution with crushed ice. The nitrostibinic acid was found to be soluble in alcohol and the crude product was purified by dissolving in alcohol and precipitating the stibinic acid with water. The ketone was then converted into its semi-carbazone and the nitro-group reduced, with aluminium mercury couple. The free ketone was then regenerated by warming with dilute hydrochloric acid and the amino-group replaced by hydroxyl through diazo reaction. The keto group was again converted into its semi-carbazone.

The constitution of the nitration product of acetophenone-4-stibinic acid, described before, is a matter of uncertainty. The orienting influence of both SbO_3H_2 and $CO.CH_3$ is *meta*. But in our experiments, the main product isolated is acetophenone-2-nitro-4-stibinic acid. The constitution of this was established by the following reactions: Nitroaceto-phenone stibinic acid was treated with dilute sulphuric acid and potassium iodide when the antimony complex was removed and repleced by iodine, the product thus isolated being 2-nitro-4-iodoacetophenone. On oxidation with alkaline permanganate, $-CO.CH_3$ was converted into $-COOH$ group giving 2-nitro-4-iodobenzoic acid. By distillation with soda lime, the carboxyl group was removed giving 3-nitroiodobenzene identical with an authentic example in every respect. Thus it is clear that in this case the nitration product isolated by us is 2-nitro-acetophenone 4-stibinic acid.

The physiological action of the final product—semi-carbazone of 2-hydroxy acetophenone-4-stibinic acid—was not satisfactory. The M.L.D. for white mice lies between 150 and 200 mg. per kg., but it was found to have only a slight action in cases of Kala-azar and that only in its early stages.

4-Acetylaminoacetophenone

This was prepared by a modification of the method described by Kunchell.[3] To a mixture of acetanilide (10 g.) and anhydrous aluminium chloride (30 g.) in carbon disulphide (25 c.c.) under reflux, acetyl chloride (15 c.c.) was added gradually with vigorous agitation during 30 minutes. The reaction was then completed by heating on a water-bath for one hour and excess of carbon disulphide was distilled off. The dark red oily reaction product was then well cooled in ice and then treated with ice-cold dilute hydrochloric acid. A pasty light brown solid was thus obtained which was filtered off and recrystallised from water (charcoal) as light brown crystals, m.p. 166-67°; yield 7.5 g. The hydrolysis of the acetyl group was carried out according to the method of Kunchell (*loc. cit.*). The crude product was crystallised from water, in glistening yellow plates, m.p. 104-5°.

Acetophenone-4-Stibinic Acid

4-Aminoacetophenone (10 g.) was dissolved in water (30 c.c.) and hydrochloric acid (7.5 c.c.). The solution was cooled to 0° and diazotised with the addition of sodium nitrite (5 g.) in water (20 c.c.). A solution of antimony trichloride (7 g.) in hydrochloric acid (25 c.c.) was then gradually added to the diazo solution and the precipitated yellowish white solid was filtered off, washed first with hydrochloric acid (d. 1.12) and then with water. The moist mass was then suspended in

* Reprinted from the "Proceedings of the Indian Academy of Science," September, 1936.

water, cooled to 10° and a solution of caustic soda added, under vigorous stirring, till faintly alkaline. After the evolution of nitrogen had slackened off (1 hour), the liquid was nearly neutralised with dilute sulphuric acid and saturated with carbon dioxide for 15 minutes.

The dark coloured residue was filtered and the filtrate acidified with dilute suphuric acid when the free stibinic acid separated as a light brown mass. The precipitate was allowed to stand overnight in a refrigerator and filtered off. It was then suspended in water and dissolved by the gradual addition of dilute caustic soda till faintly alkaline. The alkaline solution was then evaporated to dryness *in vacuo* over sulphuric acid and the brown residue repeatedly extracted with methyl alcohol, filtered and the filtrate treated with excess of ether when the sodium salt separated as a light brown mass. This was again filtered off, washed with ether and dried *in vacuo* over liquid paraffin (yield (3 g.).

The sodium salt was a light red amorphous powder, decomposing between 220 and 40° without melting. It is very soluble in alcohol and a concentrated solution in water gave no precipitate when treated with large excess of alcohol. When an aqueous solution was first acidified with dilute sulphuric acid, the free stibinic acid separated, which, however, dissolved in excess of dilute acetic acid. On the addition of barium or calcium chloride insoluble barium or calcium salt of the stibinic acid separated as an amorphous mass.

2-Nitro-Acetophenone-4-Stibinic Acid

Sodium salt of acetophenone-4-stibinic acid (5.5 g.) was dissolved in anhydrous formic acid (40 c.c.) and added very slowly to concentrated sulphuric acid (25 c.c.) cooled to 0°, with mechanical stirring. A mixture of nitric acid (1.5 c.c., d. 1.40) and sulphuric acid (10 c.c., d. 1.84) was then slowly added to the cooled sulphuric-formic acid solution of the stibinic acid at 0°-5° with gentle stirring. The stirring was continued for 60 minutes after the addition of the whole of the nitrating acid. The thick brown liquid was then poured into crushed ice (100 g.) when a light red gelatinous mass separated. The mass was separated by centrifuging the liquid and was washed free from acid with water. Contrary to our expectations, this stibinic acid was found to be rather soluble in alcohol, and its purification was effected by dissolving the solid in rectified spirit and adding an excess of water when the free stibinic acid was precipitated (twice). Finally, it was dried *in vacuo* over fused calcium chloride (yield 3.5 g.).

The nitro-stibinic acid was found to be a light brown solid easily soluble in alkali or alkali carbonate and precipitated by the addition of mineral acids or acetic acid. On being heated with concentrated hydrochloric acid and then diluting and treating with sulphurated hydrogen, an orange precipitate of antimony sulphide was obtained. As stated before, it was soluble in alcohol and insoluble in water. Insoluble calcium or barium salts were thrown down when a solution of the sodium salt was treated with calcium or barium chloride.

Semi-carbazone of 2-Nitro-Acetophenone-4-Stibinic Acid

The semi-carbazone was prepared from the ketone by dissolving the nitroketonic stibinic acid in dilute caustic soda (avoiding excess) and warming on a water-bath for several hours with semicarbazide. A white precipitate of the antimony oxide separated during the heating and was removed by filtration. The free stibinic acid was then precipitated by adding dilute acetic acid, filtered and washed repeatedly with cold dilute hydrochloric acid to remove excess of semicarbazide. The sodium salt was then prepared as usual and was precipitated by the addition of alcohol (twice). Finally, it was filtered off, washed and dried as usual *in vacuo*. It is a light pink amorphous powder, freely soluble in water, forming a red solution. On acidifying with dilute hydrochloric acid and adding sodium nitrite, copious evolution of nitrogen was noticed.

The corresponding nitro compound (2 g.) was dissolved in water (50 c.c.) and gradually treated with aluminium mercury couple (4 g.) in the course of 4 hours. After standing overnight, the precipitated aluminium hydroxide was filtered off and the precipitate twice extracted with dilute sodium carbonate and the filtrate and the extracts saturated with carbon dioxide. After filtration from the separated solid, the clear liquid was acidified with dilute acetic acid when a gelatinous precipitate separated. On examination, this was found to be the desired product and was converted into sodium salt by treatment with the required quantity of sodium carbonate, and the aqueous solution subsequently precipitated by alcohol when the sodium salt separated as a light pink amorphous mass (yield 1 g.). It is a faint pink powder, easily soluble in water to a red solution. When treated with dilute acetic acid, it gave a precipitate which dissolved in dilute hydrochloric acid. It gives diazo reaction with evolution of nitrogen.

2-Aminoacetophenone-4-Stibinic Acid

This was prepared from the above compound by splitting off the semicarbazide by heating with 25 per cent. hydrochloric acid. It was found, however, that a considerable part of the stibinic acid itself was decomposed during this heating, as the stibinic acids are unstable in presence of strong mineral acid. After filtering off the insoluble by-products the liquid was cooled in a freezing mixture and treated with freshly prepared ice-cold fuming hydrochloric acid (d. 1.20) when a white precipitate separated. This was found to be hydrochloride of the amino body and was filtered off in the cold. It was then dissolved in a small quantity of ice-cold water and saturated with sodium acetate when a precipitate separated which was found to be the required stibinic acid. Sodium chloride and excess of sodium acetate was removed by repeated washing with distilled water and the free stibinic acid was converted into sodium salt as described before. The sodium salt found to be soluble in water and in dilute mineral acids. It gave diazo reaction without evolution of nitrogen.

Semi-carbazone of 2-Hydroxy-Acetophenone-4-Stibinic Acid

The regenerated aminoketone stibinic acid was dissolved in dilute hydrochloric acid, cooled to 0° and diazotised with the necessary quantity of sodium nitrite, the liquid was then allowed to stand at ordinary temperature till evolution of nitrogen had ceased (3 hours). A precipitate was found to have separated during this time, which was removed by filtration, washed and dissolved in dilute sodium carbonate. Semicarbazide (2 g.) was dissolved in water (10 c.c.) and neutralised with dilute alkali. The two solutions were mixed and heated on a water-bath at 60-80° for two hours and allowed to stand overnight. The liquid was then filtered, acidified with dilute hydrochloric acid, and the resulting precipitate washed first with dilute hydrochloric acid and then with water. It was then converted into sodium salt as usual.

[1] "Klin. Woch.," 1924, 48, 2184.
[2] Gibson and Levin, "J. Chem. Soc," 1931, 2388.
[3] Kunchell, "Berichte," 1900, 33, 2642.
[4] Ger. Pat. 259,875; 287,709.
[5] "Berichts," 1900, 33, 2642.

THE Howard Smith Paper Mills, Ltd., Cornwall, Ontario, have recently taken out a Dominion charter for a subsidiary company to be known as the Howard Smith Chemicals, Ltd., for the purpose of manufacturing varillin from sulphite liquor. It is stated that it is a well known fact that wood contains approximately 2 per cent. vanillin and, by means of a process developed by the Howard Smith Paper Mills this may be extracted from the sulphite liquor produced in the manufacture of paper. The new plant, relatively small, is to be built in such a way that the capacity can easily be increased when the demand warrants such extension. The capital of the new company will be $100,000, in 6 per cent. cumulated preferred stock and 20,000 shares of no par value common stock, all of which has been subscribed.

Recent Developments in Textile Processing

By A. J. HALL, B.Sc., F.C.I., F.T.I.

IN the past, a number of methods have been used for determining the damage produced in wool materials by deleterious treatments. The Pauly test depends on the reddish-brown colouration produced in damaged wool when treated with diazotised sulphanilic acid, whilst the staining test of Sieber rests on the increased affinity of damaged wool for Benzopurpurine 10B. But more recently, M. Harris and A. Smith (" Amer. Dyestuff Rep.," 1936, *25*, 542 P) have found that a fairly rapid quantitative method is one in which the solubility of the wool in a dilute solution of caustic soda is a measure of the degree of damage. Briefly stated, the test consists of steeping the wool in 100 times its own weight of 0.1 N. caustic soda solution at 65° C. for one hour, then washing the residual wool with two litres of water, followed by drying at 105° C. and weighing to determine the loss of weight. Under these conditions normal wool loses about 11 per cent. in weight whilst damaged wools may lose up to 40 per cent.

The Wool Molecule

In recent years it has become evident that the cystine group in the wool (keratin) molecule largely determines its properties and for this reason it is very interesting to note that Harris and Smith find the alkali-solubility of the wool, as determined in the test described above, to correspond with the loss of cystine. Thus normal wool, having an alkali solubility of 12.6 per cent. and a crystine content of 11.5 per cent., has reduced cystine content of 6.7 per cent. after the wool has been excessively damaged by chlorination and in a condition such that its alkali-solubility is 37.9 per cent. Harris and Smith have been able to show that the alkali-solubility of wools damaged by oxidation (exposure to ultra-violet light, hydrogen peroxide bleaching, and chlorination as in the well-known unshrinkable finish for wool) is not only a measure of their deterioration but also a reliable guide to their reduced wearing properties.

The cystine group of wool is also concerned with a new process for treating wool so that it has improved " setting " properties (Brit. Pat. 443,359). It is well known that under the influence of steam wool fibres can be stretched and permanently set in their stretched condition. In some wools, however, especially those which have suffered some kind of oxidation, this setting power is less than normal. By this new process, which consists of treating the wool with a warm solution of such substances as sodium sulphite and sodium metabisulphite in the presence of a sulphonated fatty alcohol, the wool can be restored to its normal condition.

In order to give wool fabrics a warm compact handle they are often subjected to a so-called " milling " process in which they are agitated and repeatedly compressed in a soap or acid liquor; a certain amount of felting takes place. It is claimed that after wool has been treated with sodium sulphite in the manner just described it mills or felts considerably more quickly so that the processing time can be advantageously curtailed.

Removing " Pitch Marks " from Wool

Another new wool process (Brit. Pat. 432,018) is concerned with removing pitch, tar and other " branding " paints from raw wool as cut from the sheep. Such impurities in wool give a great deal of trouble to wool scourers in spite of the fact that many organic solvents have from time to time been recommended as satisfactory for dissolving them from the wool.

It is now proposed to remove these impurities by a special oiling treatment prior to scouring. Essentially the treatment comprises impregnating the raw wool with about twice its own weight of commercial oleine (another aliphatic carboxylic acid such as palmitic, stearic, or elaidic acid can also be employed in place of oleine), then (after about ten hours) hydroextracting the excess oleine and removing the remainder by washing the wool in a weak alkaline bath at about 50° C. Under these conditions the tar and other impurities are emulsified in the oleine so that they wash out in the alkaline liquor. The washing liquors are collected and acidified with sulphuric acid so that the fatty acid can be recovered and used again.

Viscose Staple Fibre

In connection with rayon, increasing attention has been devoted to the utilisation and properties of viscose staple fibre (Courtald's *Fibro*, and Germany's *Vistra*). In those fabrics, and other materials where viscose staple fibre is present with cotton it is desirable that the rayon constituent should withstand the processes to which cotton fabrics are normally subjected, for example, mercerisation with caustic soda, bleaching with acidified sodium hypochlorite, and kiering with alkaline detergents. The behaviour of viscose staple fibre under these treatments has been investigated by several workers.

Korte, Kayser and Waibel (" Textilberichte," 1936, *27*, 801) have shown that viscose staple fibre can be subjected to these processes without appreciable impoverishment. Bleaching certainly produces a small loss of tensile strength and extensibility, but it is no more than occurs with cotton. Also, in mercerising, whilst special methods of removing the caustic alkali (as, for example, by washing with boiling water, or with a solution of common salt) may leave the rayon in better condition than is the case when washing is effected simply with cold or warm water, there is not sufficient justification for employing these special washing processes. More detailed information concerning the mercerisation of materials containing viscose staple fibre have been published by O. Mecheels (" Textilberichte," 1936, *27*, 727 and 804), and the results of similar investigations have appeared in " Silk and Rayon," 1936, *10*, 701; these latter deal particularly with the behaviour of yarns consisting of 100 per cent. Fibro and 80 per cent. Fibro—20 per cent. cotton towards caustic soda solutions increasing in concentration from 2 Tw. to 80 Tw. and apparently a solution of 42° Tw. is most harmful to the softness of handle and lustre of viscose staple fibre.

The Processing of Crepe Fabrics

Rayon crepe fabrics are still very popular and a very large amount of the different types of rayon are consumed for this purpose. Yet the processing of crepe fabrics involves many difficulties both in the treatment which develops the pebble (crepe) appearance and in the dyeing operations. Many factors such as the degree and regularity of twist in the constituent yarns, the nature of the size on the warp yarns, and the temperature and composition of the creping bath have to be considered during creping. It is therefore useful to note that Saxl (" Textile Research," 1936, *6*, 515) has devised an ingenious method for examining the character of the surface of a crepe fabric so that this can be correlated with the creping process.

Saxl has found that it is easy to form a plaster of paris cast of the fabric surface which can afterwards be handled without distortion such as occurs with the fabric itself. The cast is taken by first impregnating the crepe fabric with olive oil (this prevents the plaster sticking to the fabric) and then applying first a 10 per cent. suspension of plaster of paris and afterwards a more concentrated 25 per cent. suspension to form a secondary layer. After about two hours the plaster has set so that the fabric can be peeled off, and is then ready for careful examination.

Casein (artificial) wool forms the subject of an interesting article by P. Larose (" Textile Colorist," 1936, *58*, 697). It

will be remembered that this new fibre, first produced on a large scale in Italy, has aroused a large amount of interest in textile circles. Will wool be equalled or displaced by artificial fibres resembling it in composition if not in form? At the present time it is difficult to foresee when the rayon industry will be abe to produce fibres having the characteristic crimp and surface scales of the true wool fibres, but it is actually a fact that fibres having a protein composition similar to that of the keratin of wool are now being produced on a large scale and are being woven and knitted into fabrics of reasonable durability.

Larose is able to record many of the more important properties of the Italian wool substitute (Lanital—made from the casein of skimmed milk). The fibres have a circular cross section and have a soft handle equal to that of a good quality wool. The fibres are about as fine as a 60's top wool, and they vary less than the natural fibre. It is unfortunate, however, that Lanital fibres have only about one-half the tensile strength of natural wool; to some extent this is compensated for by a higher extensibility (90 per cent. for Lanital and 30 per cent. for natural wool at the breaking point). Lanital gives an ash of 4.88 per cent., whereas wool has but 0.2 per cent.

Sulphur Content of Natural Wool

The sulphur content of natural wool has a great deal to do with its properties, and whilst this usually reaches 3.5 per cent. the sulphur content of Lanital is only 0.7 per cent. Perhaps connected with this is the fact that Lanital does not felt when worked in acid or alkaline liquors. But mixtures of wool and Lanital have felting properties which are sufficient to be of value in finishing processes. In this connection it is important to notice the statement of Borghetty (" Textile Research," 1936, *6*, 463) that Lanital does not hinder the felting of wool whereas other artificial fibres such as viscose rayon do. Borghetty records that the best available means of detecting Lanital in the presence of wool is by its higher resistance to dissolution than wool in a boiling caustic soda bath containing formaldehyde.

The moisture content of a fibre has a great deal to do with its physical and chemical properties, but a measurement of this moisture is often tedious when the standard methods are adopted. But quite a rapid and accurate method has been recently described by Spencer-Smith and Matthew (" J. Text. Inst.," 1936, *27*, 219 T). It involves no heating or weighing.

In this new method, the textile material is packed into a container which is also in connection with a small air pump and a humatagraph (this is a small instrument which directly indicates on a scale dial the humidity of the air in contact with it). By means of the pump the whole air content of the apparatus is continuously circulated through the textile material for a few minutes and until it is in equilibrium with the textile material as regards its moisture content. Any change thus produced in the moisture content of the air makes no appreciable alteration in the moisture content of the textile material since the amount of air is comparatively small. At this stage the humidity can be read off on the scale, and by means of a curve the moisture content of the textile material can be at once calculated. It would seem that this method and apparatus is about as simple as can be desired for such moisture measurements, and that its use in other sections of the chemical industry is obvious.

Bright Colours on Black Background

Lakes and pigment dyes contain many of the colours most fast to light and washing, but it is obviously difficult to apply them satisfactorily to textile fabrics by the usual dyeing methods since such dyes have little or no affinity for textile fibres. They can be applied by printing if an adhesive substance such as albumen is used to bind them to the fabric.

A method has recently been described (" Textilberichte," 1936, *17*, 816) by which these pigment dyes can be used as reserve colours under Aniline Black so that coloured prints, often of very bright colours, can be produced on a solid black background. It is claimed that these dyes are very suitable for the purpose and the composition of a suitable reserve printing paste containing albumen, magnesium and sodium acetate and zinc oxide (resist substances), is given. The fabric is first impregnated with the aniline black liquor, then printed with the coloured reserve paste, dried, steamed in a Mather-Platt for four minutes, afterchromed for one minute at 40° C. in 0.2 per cent. sodium chromate solution, and then washed.

Increasing Applications of Artificial Resins

Mr. H. V. Potter at the Royal Society of Arts

MR. H. V. POTTER, B.Sc. F.I.C., managing director of Bakelite, Ltd., read a paper on " Artificial Resins " at the Royal Society of Arts on Wednesday evening. Dr. E. F. Armstrong, a vice-president of the Society, was in the chair.

The work of Dr. Baekeland, which has been so successfully commercialised was, said Mr. Potter, the foundation of the resinoid industry throughout the world. Up to that time very little progress had been made. What activities there were here were confined to the production and sale of the resinoids in solution as protective coatings or investigations into the production of hardened amber-like pieces either to replace amber in electrical machines or small insulating parts turned out of rod or sheet, but great difficulty was found in commercialising this process. Dr. Baekeland's discovery immediately led the way to a method of producing these resinoids in a form in which they could be sold to other industries to manufacture into useful articles by chemically converting them by heat and pressure into hard inert articles by a simple process of moulding in heated moulds under hydraulic pressure.

This new product, which was termed " bakelite " after the name of its inventor, was the foundation of a new industry—the synthetic resin industry, now grouped within the plastics industry, playing its part alongside the other plastics such as celluloid, casein, ebonite, all of which have a much older foundation, but useful plastics in a different field.

The new resinoid industry was not content to rest on its laurels, but research was carried out by Dr. Baekeland, of the Bakelite Co., as it then was, and later by other concerns. This resulted in considerable improvement, and the curing time of the resinoid moulding powders was brought down to five minutes. The change from the fusible state to the hardened non-fusible state is now only a matter of seconds.

Use in the Electrical Industry

Another activity connected with this industry developed quite apart from the moulding industry. The electrical manufacturers had been using for some time insulation for transformers and switchgear made from paper coated with shellac varnish and pressing layers of such paper together under heat. The new resinoids gave them an improved material, as shellac showed a tendency to soften at higher temperatures, whereas these new resinoids when polymerised under heat were permanently hard and did not soften at all. There was a growing demand for insulation that would stand greater voltages and consequently higher temperatures, and these new resinoid materials assisted in meeting these requirements.

It is difficult to imagine the change that has taken place in products made from resinoids as a result of improvement

in material, technique and processes over the crude products of the early days—twenty-five years of research at heavy expense has wrought a great change and yet most of us feel the industry is still only in its infancy. It may be likened to a child who has cut its teeth and is now in the growing stage. Some of the beautiful mouldings produced in new types of resinoids, such as the urea-resinoids or amino-plastics, are an outcome of the original cruder products of the early days of 1908-1912. It was then only possible to have articles in black, brown or amber. To-day it is possible to have a resinoid plastic article in white or practically any colour or as transparent as glass.

Early Drawbacks Overcome

The phenol plastics had two drawbacks in the earlier days: (1) It was dark amber in colour, that is brown; therefore did not lend itself to uses where light colours were required; (2) it possessed an odour of phenol when heated. These features limited the application of these materials to industrial applications, such as in the electrical or mechanical field; they could not be successfully exploited where light colour or non-odour was important. This led to many investigations to look for other types of resinoids which did not possess these disadvantages.

The raw materials, phenol in one case and urea in the other, along with formaldehyde, are intermixed with the respective accelerators into reaction vessels. In the case of the phenol resinoid heat is applied; in the other, the reaction may be carried out in the cold. The actual result is the production of a resin-like product in the first case or a thick syrup in the second after the removal of water. The resin-like or syrup-like product is then mixed with suitable fillers, such as wood flour or paper pulp, to the extent of about 50-60 per cent., by a process of rolling, kneading or mixing so that the resin is ultimately mixed with the filler and ground to a coarse powder. This moulding powder is one of the many forms into which the resinoids are produced, but is one of the most important because as a result of their development a new plastic moulding industry developed, whose purpose was to take the powder produced by the resinoid industry and press it or mould it into many articles of commercial and technical value, and exploit their application.

The moulding process is effected by constructing steel moulds with which the negative of the shape of the article has been cut, placing such mould on steam heated hydraulic presses, introducing the resinoid moulding powder and pressing the powder, which becomes plastic under heat and pressure, into the shape or the contour of the mould and hold the plastic in the mould for a few minutes until the hardening reaction takes place, and producing a hard, rigid, compact article in the shape required.

The Laminated Product

The laminated product consists of layers of paper, fabric or any material which is absorbent and can be obtained in sheet form, treated with a solution of the resinoid, dried out and pressed under heat and great pressure into solid sheets or blocks, or even simple shaped articles such as domestic trays, tubes, plates, insulators and other things. This product is a combination of a resinoid with a fibrous filler in the woven or loose state. It has certain advantages over plastic moulding powders. The presence of the long fibrous filler gives the finished hardened product added strength and is more resistant to shock. These materials, when built up of layers of the paper or woven fabric pressed together under great pressure and heat, are produced in sheet form of varying sizes and thicknesses or moulded into simple shapes. On the other hand, if the sheet which has been impregnated is cut up into pieces of small size then it can be moulded in the same manner as moulding powder and used in production of gear blanks and mouldings of a complex nature which would be more expensive to manufacture from sheet and yet which require some resistance to shock.

Before leaving the heat-hardening resins of the phenolic and amino types, Mr. Potter mentioned the important part the former resins are playing as a base for paints and varnishes. The urea type are perhaps more useful as light coloured protective coatings in the form of lacquers, but the phenolic type are now well recognised as a base for protective varnishes and enamels, and have a superiority in weather resistance which renders them of value for marine and varnishes. This field is growing, and with the discovery of new types of substituted phenols produced chemically, many new resinoids are coming on the market for the varnish maker to use. It is likely, however, that natural resins will continue to be used in conjunction with the resinoids to give more useful products than either of them separately.

Alkyd Resinoids

Alkyd resinoids have not the same properties as the others, but they have an extensive application in particular fields. The manufacture of alkyd resins is in a general way very similar to that of other resins, but differs in details. For example, the time required for reaction to be complete between the glycerine and phthalic anhydride by heat is much longer. The result, however, is a hard water-white resinoid which can, on continued heating for a matter of many days, be changed into an infusible and hardened product which is still reasonably colourless, but has a horn-like property when cut. In this form it is used for decorative purposes, such as bangles, trinkets, pencil barrels, etc.

Alkyd resinoids may, however, be dissolved and utilised in this form for the purpose of building up micanite insulation, that is, flakes of mica which are stuck together with the glyptal varnish and finally pressed and hardened. This material has extensive use in the electrical industry and the glyptal is utilised in place of shellac on account of its good adherence for mica and its higher heat resistance than the natural gum. The products made in sheet form by this method have also been utilised for decorative purposes, such as lamp shades, electric sign fronts, on account of its transparency and pleasing effect of the combination of the layers of mica with the transparent mica. One of the extensive uses of this class of resinoid is as a base for the manufacture of paints and enamels.

Extensions at Llandarcy

Improved Oil Refining Plant

NATIONAL Oil Refineries, Ltd., the Anglo-Iranian Oil Company's subsidiary operating the Llandarcy, Swansea, refineries, is to carry out a big plant improvement and extension scheme in the near future. A contract has been placed for the first section of the plant improvement scheme—a combined atmospheric and vacuum distillation unit with an input capacity of about 10,000 barrels per day of crude oil. This unit will supersede the existing primary distillation units, and also provide, at the same time, the secondary or vacuum distillation stage for producing lubricating oil base stocks. The plant will take the form of continuously operating pipe still heaters, coupled to fractionating columns and condensers, and will be fired with chain grate stokers, fed with local coal, with a subsidiary thermostatically controlled oil burner to give the fine temperature control necessary for the process, but which is not obtainable from coal burning by itself.

This first scheme will be supplemented by contracts for solvent dewaxing and extraction plants and for high temperature oily treatment plants for lubricating oils. It is expected that all sections of the various schemes will be completed in approximately 18 months.

IMPORTS of citric acid into Brazil during the first six months of 1936 amounted to 85,763 kilos, compared with 60,129 during the corresponding period of 1935.

New Dyestuffs and Their Characteristics

Three I.C.I. Products

COOMASSIE Blue BLS, an addition to the I.C.I. range of acid wool dyestuffs, possesses good level dyeing properties and is valued for its bright reddish blue shade; it is also useful as a basis for fast navy shades on woollen and worsted yarns and on piece goods of all types. By virtue of its good cotton preservation properties when dyed in a neutral bath, it serves as a very useful shading colour for the wool in wool-cotton unions and for the silk in silk-cotton unions whilst solid shades on wool-silk unions may be obtained by dyeing from either a neutral or an acid dyebath. Coomassie Blue BLS is very suitable for the dyeing of weighted and unweighted silk on account of its ease of application, level dyeing properties and bright shade of good all-round fastness. It is also of interest for paper dyeing; particularly in the production of high quality papers.

SOLEDON GREEN GS POWDER is an addition to the I.C.I. range of Soledon dyestuffs, which are solubilised vat dyestuffs possessing the fastness properties associated with the normal vat dyestuffs, but are much simpler to apply to either yarn or piece goods. It possesses excellent fastness properties and, since its solubility in water is very good, it is possible to obtain shades, particularly as regards penetration and levelness, which are difficult to obtain with normal vat dyestuffs. By virtue of these properties it is eminently suitable for the dyeing of linen piece goods, mercerised poplins, cotton limbrics, mixed fabrics of viscose rayon and cotton, staple fibre and materials which are difficult to penetrate in pale shades. Owing to the fact that no reduction process is required for its application, Soledon Green GS Powder is specially recommended for the production of pale coloured ground shades on materials containing vat or azoic dyed effect threads or woven stripes, and for the topping of azoic dyed shades.

THIONOL SKY BLUE 6BNS has the advantage of being much brighter and slightly greener in shade than Thionol Sky Blue 6BS and is, therefore, of greater importance to dyers of plain dyed cloths of all types, cotton, linen and viscose, where very good fastness to light, perspiration, rubbing and washing are desired, whilst its very good fastness to vulcanising, both heat and cold cure methods, renders it of particular interest for dyeing materials which are to be subsequently rubber proofed.

A Disputed Trade Mark

Motion by Boots Dismissed with Costs

IN the Chancery Division on December 4, Mr. Justice Crossman gave judgment on a motion by Boots Pure Drug Co., Ltd., by way of appeal from a decision of the Assistant Comptroller of Patents with regard to a trade mark registered by that company. The respondents were a French company, Société des Usines Chimiques Rhone-Poulene. The facts appear fully from the judgment.

His lordship said this was both a difficult and interesting case. It came before him as an appeal by Boots Pure Drug Co., Ltd., from a decision of the Assistant Comptroller of Trades Marks, directing that the register of trade marks be rectified by removing their trade mark "Livron," registered under Class 3 in respect of tonic medicines. The trade mark was registered in March, 1932, and it consisted of the word "Livron," standing alone. In March, 1934, the Société des Usines Chimiques Rhone-Poulene applied to the Registry to expunge the trade mark in question. In June, 1934, a director of the French company made a declaration in support of the application and stated that it was not till 1933 that the trade mark "Livron" was brought to their notice and they then communicated at once with their patent agents. Boots refused to cancel the registration.

"Livron" was the name of a small town in France, and had a geographical significance. The French company were the manufacturers of fine chemicals, and one of their factories was at Livron, and they were known as of Livron.

Mr. Walter Williams, assistant secretary of Boots Drug Co., had stated on behalf of the company that the word "Livron" was originated by his company, was a newly invented word with no ordinary meaning, and was a novel word. The company had used the word since 1932, and it denoted a tonic of their manufacture. It had been widely advertised, and he submitted that there was no case of confusion. The carton containing the production said: "A Product of Boots Co.," and underneath, "Livron."

The matter in due course came on for hearing before the Assistant Comptroller, and he directed the removal of the trade mark from the register. Boots gave notice of motion to reverse that decision. The application by the French company to the Registrar was made under the Trades Marks Act, 1905-19. The French company said they were the persons aggrieved by the entry into the register "without sufficient cause" of the trade mark, and by the trade mark remaining in the register.

His lordship said he had to consider whether the facts now proved were at the date of the register sufficient to justify the registration. It had been decided that a trade mark must be a distinctive word. The Assistant Comptroller, relying upon decided cases, held that "Livron" was not an invented word which came within the Acts, because it was a word already in existence, although Boots believed they had originated it. That decision, in his lordship's view, was supported by the decided cases. His lordship thought it was not an invented word in fact, but only in the belief of the Boots Company, and that was not sufficient to make it an invented word. Then the Assistant Comptroller held that Livron, according to ordinary significance, was a geographical name and therefore did not come within the sub-sections of the Act. In his lordship's judgment "Livron" was a word whose only significance was geographical and was not within the sub-section.

At the time of registration it had no significance, and the Assistant Comptroller was right when he made his decision on the point. The Assistant Comptroller held that "Livron" was not adapted to distinguishing the goods of Boots, and was not registerable.

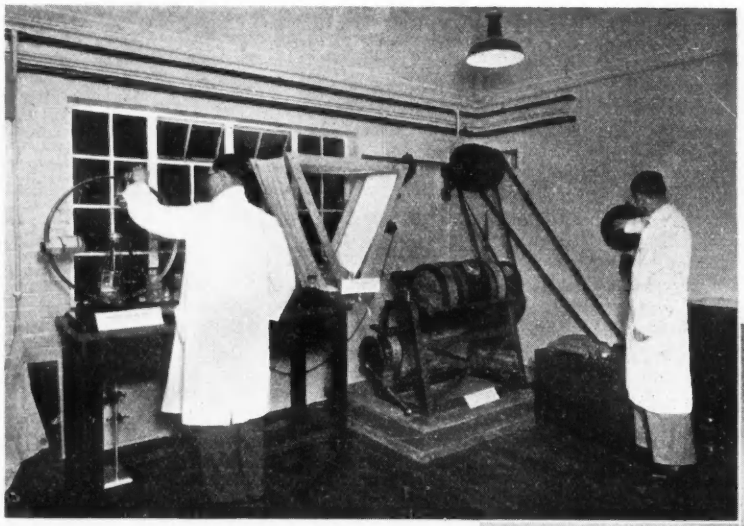
Under the circumstances, his lordship held that the entry of the trade mark in the register was made without sufficient cause under the Act.

The Assistant Comptroller was right in his decision, and he dismissed the motion with costs.

Mr. Swan, K.C., for the applicants, asked for the order to be suspended for four weeks to enable Boots to consider the position.

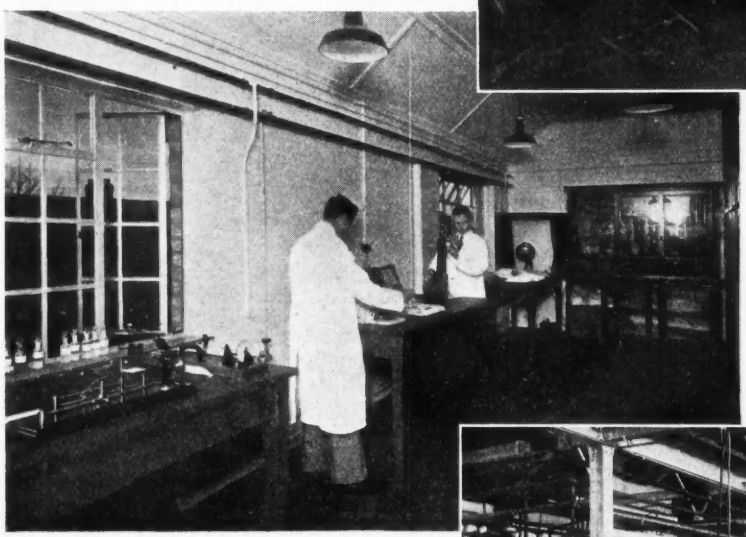
Mr. Burrell, for the French company, agreed, and his lordship suspended the order for four weeks.

Laundry Research Laboratories at Hendon



VIEWS at the British Launderers' Research Association's Laboratory, extensions to which were opened last week by Sir William Bragg, president of the Royal Society.

The top picture shows one of the new research laboratories. On the right of the picture is an experimental washing machine especially designed for the investigation of problems connected with wool washing. On the left of the same picture is an apparatus used for rapid preliminary tests of washing efficiencies of detergent solutions. The triangular structure in the centre is a soiling machine for impregnating woollen fabrics with artificial soiling mixtures.

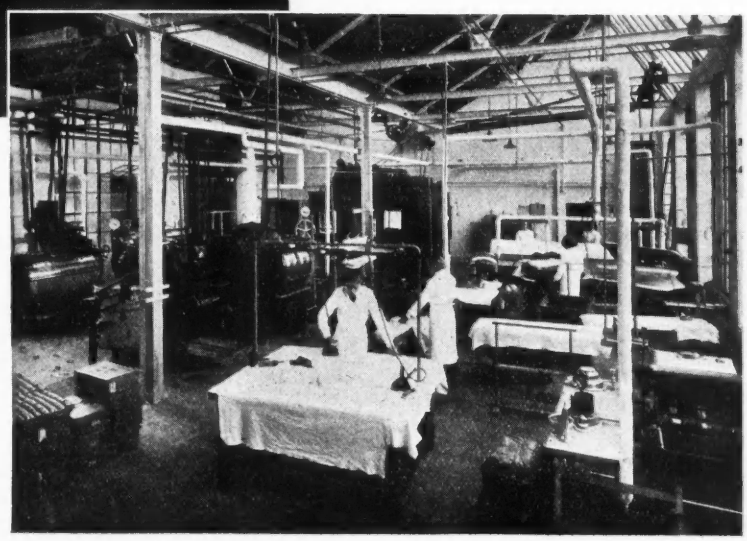


The second illustration shows an apparatus consisting of a combined humidostat and tensiometer for investigating surface tension of detergent solutions under carefully controlled conditions.

Methods of testing the strength of fabrics in the new textile laboratory are shown in the third illustration.

Results obtained in the laboratories are tried out on a commercial scale in an experimental laundry attached to the premises where one and a half tons of washing are dealt with each week. The bottom picture shows a section of the laundry, in which new models and new inventions are constantly being tested.

An important section of the laboratories is the analytical department which undertakes the testing of materials and laundered articles submitted by members. More samples were examined in November than in any previous month.



Notes and Reports from the Societies

Society of Glass Technology

A Visit to St. Helens

THE first meeting of the Society of Glass Technology to be held at St. Helens will be held there next Wednesday. The leading glass manufacturers of the town are co-operating to welcome the Society, and by the kindness of Pilkington Brothers, Ltd., the members will have an opportunity of visiting their sheet glass works during the morning. The directors of Forster's Glass Co., Ltd., and the United Glass Bottle Manufacturers, Ltd., have jointly invited the members to luncheon at the Fleece Hotel, St. Helens. At 2 p.m. there will be a special meeting of the Society, at which amendments of rules will be proposed for the purpose of providing that the accounts of the Society shall be audited in future by professional accountants instead of by two elected members. An ordinary meeting will follow at which papers will be presented on "The Bursting Pressure Test for Glass Bottles," by Mr. A. Cousen; "Notes on Annealing Lehrs," by Mr. C. J. Peddle; and "Sand Blasting and Other Processes for Decorating Glass," by Mr. S. Pollitzer.

Society of Chemical Industry

Hurter Memorial Lecture

MODERN technique in biochemistry formed the subject of the 17th Hurter Memorial Lecture, delivered by Professor I. M. Heilbron, F.R.S., Sir Samuel Hall Professor of Chemistry at Victoria University, Manchester, before the Liverpool Section of the Society of Chemical Industry, at Liverpool University on December 4. Professor T. P. Hilditch, chairman of the Section, presided.

In his opening remarks, Professor Heilbron pointed out that the striking advances in our knowledge of those essential principles of life, the vitamins, hormones and enzymes, recorded during the past decade have been largey due to two causes. Firstly, the refinement of laboratory technique, especially the development of micro-methods; and, secondly, the wider application of physico-chemical methods to structural problems. In dealing with the methods employed for the isolation of substances present only as traces in living tissues, emphasis was laid upon the importance of chromatographic analysis, which has opened up many new fields of investigation in biochemical problems. The procedure depends upon the differential retention of the components of a mixture upon a surface of a suitable adsorbing medium, and the delicacy of the method is such that as little as one-thousandth of a gram of a specific compound can be isolated in a state of purity.

Professor Heilbron discussed certain of the newer quantitative micro-methods now employed for the elucidation of structure, especially where the total amount of available material was of the order of a fraction of a gram. This description was accompanied by practical demonstrations of the technique employed in quantitative micro-hydrogenation, high vacuum sublimation, chromatography, etc.

The importance of absorption spectra in biochemical investigations was also described in detail. Its application to initial processes of concentration of biologically active factors was stressed, and its more precise application in the characterisation of specific chromophoric groups was illustrated by reference to individual vitamins and hormones. Within the last month an investigator, he remarked, had isolated the real vitamin D from the liver oil of tunny fish. Calciferol was not the real vitamin D, as they thought up to a few months ago.

Dr. Hurter, son of the late Dr. Ferdinand Hurter, in whose memory the lectures were instituted, proposed the vote of thanks, which was seconded by Alderman Edwin Thompson.

Physical Society

Annual Exhibition of Scientific Instruments

THE 27th annual exhibition of scientific instruments and apparatus, arranged by the Physical Society, will be held at the Imperial College of Science and Technology, Imperial Institute Road, South Kensington, London, S.W.7, as follows:—Tuesday, January 5, 2.30 p.m. to 9 p.m.; Wednesday, January 6, 4 p.m. to 9 p.m.; Thursday, January 7, 2.30 p.m. to 9 p.m.

The leading manufacturers of scientific instruments will be exhibiting their latest products in the trade section. The research and educational section will contain contributions from research laboratories, and experiments of educational interest. In addition, the work submitted for the craftsmanship and draughtsmanship competition by apprentices and learners will be on view.

Discourses will be delivered on two days at 7.45 p.m. as follows:—Tuesday, January 5, "Electrical Measurements in the 'Eighties, particularly those associated with Ayrton and Perry" (Sir James Swinburne, F.R.S.); Wednesday, January 6, "The Influence of Industrial Research on the Development of Scientific Instruments" (Harry Moore, D.Sc., A.R.C.S., F.Inst.P.).

Admission to the exhibition is by ticket only. Members of institutions and scientific societies may obtain tickets from their secretaries; tickets may also be obtained direct from the exhibition secretary, 1 Lowther Gardens, Exhibition Road, S.W.7.

Society of Public Analysts

Election of New Members

AN ordinary meeting of the Society of Public Analysts was held on December 2 at the Chemical Society's Rooms, Burlington House, the president, Dr. G. Roche Lynch, in the chair.

Certificates were read in favour of Granville H. Clarke, Leonard C. Dutton, John C. Giblin, Ronald W. Gillham, Ronald M. Hamilton, Walter T. Lunt, William D. McFarlane, William S. Patterson, Thomas C. Williams and George H. Wray. The following were elected members of the Society: Frederick Brown, Alan J. Cavell, James P. Ogilvie, Richard K. Sanders, Alexander M. Smith and George E. Speight. The following were elected honorary members: Bernard C. Aston and Robert H. Pickard.

Arachis Oil in Olive Oil

The detection of arachis oil in olive oil was the subject of a paper by Mr. Norman Evers, B.Sc., F.I.C., who said the presumptive test for arachis oil in olive oil described in the B.P. 1932 gave positive results for arachis oil with 16 out of 26 olive oils of various grades and origins. In one case only was the presence of arachis oil confirmed by the further confirmatory test of the B.P. Improvements in the presumptive test were made, as a result of which only two out of the 25 pure olive oils gave positive indications. The revised test is as follows: Saponify 1 ml. of the oil with 5 ml. of 1.5*N* alcoholic potassium hydroxide by heating on a water bath for 5 minutes, guarding against loss of alcohol. Add 50 ml. of 70 per cent. (v/v) alcohol and 0.8 ml. of concentrated hydrochloric acid (sp. gr. 1.16). Heat, if necessary, to dissolve any precipitate, and cool at the rate of about 1° C. per minute, stirring *continuously* with the thermometer until a turbidity forms. If this occurs below 9° C. arachis oil is absent.

Dealing with the determination of cyanide in aqueous extracts of road tars, Mr. W. G. Moffitt, Ph.D., A.I.C., and Mr. E. H. Williams, B.Sc., A.I.C., said it had been shown that cyanide in concentration exceeding 0.01 part per 100,000 is toxic to fish. Rain washings from recently tarred roads may

gain access to fishing rivers, and it is important that they should not contain cyanide to this extent. In the method devised by the authors this proportion of cyanide can be determined with reasonable accuracy in aqueous extracts of road tars. The tar acids are removed by oxidation with silver oxide, and this is followed by distillation and subsequent extraction of the distillate with chloroform.

A rapid method for the determination of triethanolamine was described by Mr. C. J. Eastland, Mr. Norman Evers, B.Sc., F.I.C., and Mr. T. F. West., B.Sc., A.I.C. The method depends upon the isolation of triethanolamine in the form of its hydrochloride, advantage being taken of the insolubility of that compound in isopropyl alcohol. It is applicable to the determination of triethanolamine in cosmetic preparations, disinfectants, etc. A correction factor (for the solubility of the compound in isopropyl alcohol, 0.15 g. per litre at 20° C.) is applied. Glycerin, ethylene glycol, ammonium compounds, alkaloids and many of the modern emulsifying agents do not interfere with the accuracy of the method provided that sufficient time is allowed for the separation of the emulsions formed in, for example, preparations containing sulphonated alcohols.

New Technical Books

INDUSTRIAL CHEMICAL CALCULATIONS. By O. A. Hougen, Ph.D., and K. M. Watson. Second Edition. Pp. 487. New York: John Wiley and Sons. London: Chapman and Hall, Ltd. 22s. 6d.

During the five years following the first edition of this book the chemical engineering profession has progressed rapidly in the development of quantitative and exact methods of treating its problems. At the same time the problems have become more complex with the increasing application of high temperature and pressure processes. These developments have strengthened the opinion that there is need for more thorough training of chemical engineers in the exact and quantitative application of fundamental physico-chemical principles to industrial problems, as covered in this book. Extensive changes have been made in order to keep pace with the developments of the field. The thermodynamic approach to problems involving non-ideal conditions has been advanced to practical utility through the development of generalised relationships to fill the gaps of missing data, until it has become essential that a well-trained engineer be familiar with these methods. In this book this has led to the introduction of the concepts of entropy, free energy and activity, and their applications to industrial problems. The rather cumbersome kinetic-theory approach to the principles of equilibrium has been discarded in favour of the more concise and exact thermodynamic methods. The introduction of thermodynamic methods made desirable a complete reorganisation of the text. The first nine chapters, designated at Part I, are now limited to treatment of ideal low-pressure systems in which simple algebraic methods can be used. Chapters IX to XIV treat of non-ideal cases by more general and complicated methods involving considerable use of the calculus. Throughout the book emphasis has been placed on generalised methods of predicting the missing physico-chemical data that hamper almost every industrial problem. In Chapter VII new methods are presented for estimating the combustion properties of petroleum fuels; in Chapter X the calculations of crystallisation have been developed by much more concise methods; in Chapters XI and XIII there are new generalised methods for estimating compressibility factors, fugacities and heat capacities in the absence of specific data. In the first chapter a section devoted to the conversion of units has been added.

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ANALYTICAL CHEMISTRY. VOL. II. QUANTITATIVE ANALYSIS. Based on the text of F. P. Treadwell. Translated, enlarged and revised by William T. Hall. Eighth Edition. Pp. 878. John Wiley and Son (Chapman and Hall, Ltd.). 30s.

So many changes were made in the text for the present edition of this book that it was found best to reset the entire book. Much valuable help was obtained from Dr. W. R. Schoeler, of London, who examined the entire book critically and suggested many changes as a result of his extensive laboratory experience. He also suggested dropping some of the older procedures and offered some well-tested methods for determining columbium, tantalum and certain other elements. We may usefully recall the fact that F. P. Treadwell was born in New Hampshire in 1857. He completed his education in Germany and in 1878 became assistant to Bunsen, but left him in 1883 to work under Victor Meyer. In 1894 he was made professor of analytical chemistry at Zurich, where he remained until his death in 1918. Before the publishers agreed to publish an English edition of his book on analytical chemistry in 1902 the opinion of several well-known chemists was asked. One of the strongest letters in praise of the book was written at that time by Dr. W. F. Hillebrand, who knew Treadwell personally.

* * *

THE CHEMISTRY OF SYNTHETIC RESINS. By Carleton Ellis. 2 vols. Pp. 1,615. Reinhold Publishing Corporation. (Chapman and Hall, Ltd.) 97s. 6d.

This book first appeared in 1923 as "Synthetic Resins and Their Plastics," but the overwhelming number of synthetic resins and synthetic plastic products germinating in the twelve years intervening, together with the recognition of a broader knowledge of the causes and nature of resinification, have led to a change of the title to "The Chemistry of Synthetic Resins." This, however, does not signify that any condensation or elimination of sections on plastics and plastic moulding has occurred in the preparation of the new edition. On the contrary, the treatment of material on the subject has brought about a considerable expansion in the number of pages devoted to plastic moulding. While a complete revision of the text has been required to provide the present edition, both the scientific and technical aspects of synthetic resins have been given about equal weight. At the same time effort has been made to provide a complete literature survey of all species of synthetic resins. In Vol. II there is an appendix of trade names, extending to 40 pages; the subject and name index to the complete work covers nearly 200 pages.

* * *

THE NEW CHEMISTRY. By E. N. da C. Andrade. Pp. 58. G. Bell and Sons, Ltd. 3s. 6d.

In this book, based on a post-graduate lecture delivered at St. Mary's Hospital, Paddington, the author explains the recent work which has been done on the transmutation of matter, that is, the formation of one kind of atom from other kinds of atoms. This he calls the "new chemistry," in contrast with the "old chemistry" which deals with the building of molecules. The new chemistry is concerned with the combination of nuclei and the attendant energy changes; the old chemistry with the combination of atoms and the attendant energy changes. The principles involved and the methods employed, in particular the high voltage installations, are outlined, and there are many illustrations of apparatus, some of which have not previously been published in England. The author's intention has been to provide an account of recent work on atomic transmutation which may be read by all who have scientific tastes. It is only since the war, largely due to the efforts of Rutherford and his school, that the deliberate transmutation of atoms in the laboratory has been shown to be possible in an ever-increasing number of instances, and has developed into a special field of scientific research.

THE PRESERVATION OF IRON AND STEEL BY MEANS OF PAINT. By L. A. Jordan and L. Whitby. pp. 68. Paint Research Station, Teddington. 2s. 6d.

This paper is the first of a series dealing with specific problems of paint application and the price has been made low enough for all interested in the use of paint as a protective material and in the corrosion problem generally to purchase a copy. Hitherto most of the papers prepared at the Paint Research Station have been confidential to the membership of the Association, but the council has now decided to give the widest possible publication to papers dealing with certain classes of subject matter. In this way, since the beginning of this year, the bi-monthly "Review of Current Literature Relating to the Paint, Colour, Varnish and Allied Industries" has also been available to the public at a subscription rate of two guineas per year.

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ELEMENTS OF CHEMICAL ENGINEERING. By Walter L. Badger and Warren L. McCabe. Second Edition. Pp. 660. McGraw-Hill Publishing Co., Ltd. 30s.

Appreciable contributions to many of the subjects treated in this book have appeared in the literature since the first edition of this book was written. In the new edition the authors have attempted to incorporate as much of this new work as possible without departing from their original idea of an elementary text. Some parts have been rewritten in an attempt to achieve greater clarity or simplicity in the presentation. The principal changes are in the chapters on flow of heat, evaporation, drying, distillation, gas absorption, extraction, and filtration. In conformity with recent tendencies, dimensionally consistent units have been used in place of miscellaneous engineering units. The symbols used have been made to correspond, so far as possible, to the recommendations of the Committee on Standard Symbols and Nomenclature of the American Institute of Chemical Engineers.

* * *

THE CHEMISTRY OF NATURAL PRODUCTS RELATED TO PHENANTHRENE. By L. F. Fieser. Pp. 358. New York: Reinhold Publishing Corporation. London: Chapman and Hall, Ltd. 32s. 6d.

The six-year period since 1929 has witnessed the expansion of the previous small list of naturally occurring phenanthrene compounds to include several groups of substances which are as strikingly similar in structure as they are different in their actions on the animal organism. The century-old problem of the structure of the sterols and bile acids reached a culmination in 1932 with the recognition of the presence in the molecules of the characteristic perhydrocyclopentenophenanthrene ring system, and it was not long before the recently-discovered sex hormones were found to be similarly constituted. In rapid succession the cardiac glycosides, the heart poisons secreted by toads, and certain of the hemolytic saponins were revealed as cyclopentenophenanthrene derivatives. It is now known that sterols are synthesised in the organisms of higher animals as well as in plants, and it appears likely that they are the natural precursors of all of the substances of related structure, yieding bile acids, male and female sex hormones, heart poisons, saponins, and anti-rachitic agents as products of biological oxidations and reductions. The preparation of the present volume was undertaken with the idea that a review covering all of these topics in phenanthrene chemistry might be of value in consolidating the advances already made and in expediting the further development of this field. All known types of phenanthrene compounds have been considered in the discussions, whether they occur as such in nature or are formed as secondary transformation products. The chemistry of phenanthrene itself is presented in an introductory section, in order to provide a background for the consideration of derivatives which are of interest either as degradation products or as intermediates in synthesis. It has been the aim to present a comprehensive survey of the more significant and useful observations and to give prominence to correlating principles and to other matters of central interest.

THE SCIENTIFIC AND TECHNICAL FACTORS OF PRODUCTION OF GOLD AND SILVERWORK. A course of lectures held at Goldsmiths' Hall under the auspices of the Worshipful Company of Goldsmiths. Pp. 89. London: Goldsmiths' Hall. 1s.

Six lectures which were given at Goldsmiths' Hall in the winter season, 1935-1936, were a new departure. Special attention was given to the possible applications of the modern scientific knowledge of metals, with the object of assisting progress in the gold and silver trades, and the primary object of the lectures was to stimulate progress and to encourage both individual workers and craftsmen to study and apply the new discoveries which are being made in the science of metallurgy. In reprinting these lectures it is pointed out that the silver and gold trades should keep pace with the great advances which are being made in the other metal industries by the application of new discoveries.

* * *

INORGANIC COLLOID CHEMISTRY. VOL. II. THE HYDROUS OXIDES AND HYDROXIDES. By H. Boyer Weiser. Pp. 429. John Wiley and Sons (Chapman and Hall, Ltd.). 23s. 6d.

"Inorganic Colloid Chemistry" is the general title of a three-volume treatise on the colloidal behaviour of the elements and their inorganic compounds, with special reference to the rôle they have played in the development of the modern theories and applications of colloid chemistry. The first volume, dealing with the elements in the colloidal state, was published two years ago. The present volume, which is concerned with the colloidal properties and applications of the oxides, will be followed by one on the colloidal inorganic salts. During the past decade numerous investigations have greatly extended our knowledge of hydrous oxides and hydroxides, and have modified appreciably certain of the older views concerning their colloidal behaviour. After a chapter dealing in a general way with the preparation, properties and nature of hydrous oxide sols and gels, separate chapters are devoted to the hydrous oxides of iron, the aluminium family and chromium. Following these chapters the several oxides are taken up, so far as practicable, in the order in which they appear in the periodic table. The last four chapters deal with the general theory underlying some of the more important technical applications of the hydrous oxides. Throughout the book an attempt is made to correlate systematically and to discuss critically the numerous observations on the colloidal behaviour of the hydrous oxides and hydroxides. Emphasis is placed on the part which investigations with these compounds have contributed to the development of the theories of colloid science.

Letter to the Editor

The British Association of Chemists

SIR,—In your excellent report of the annual meeting and dinner of the British Association of Chemists, you refer in page 476 of the current issue of THE CHEMICAL AGE to a criticism by a Birmingham *delegate* of the basis upon which the Association's unemployment scheme operates.

The speaker in this instance was not a delegate and was not appointed as official spokesman for any group. He was expressing his own personal opinion. He has been a member for a very short time, and has not had the opportunity to appreciate the benefits of the unemployment insurance fund. The fund must be run on proper insurance lines to ensure a low premium to our members, since the object is to maintain the status of the chemist and thereby avoid an unemployed member being forced to accept an undercut salary. Fortunately, to-day, the majority of employers recognise that the chemist is worthy of his hire, and good employers do not bargain on the basis of a man's misfortunes.—Yours faithfully,

C. B. WOODLEY,
General Secretary.

British Association of Chemists,
175 Piccadilly, W.1.

Personal Notes

MR. S. F. MARTIN has resigned from the directorate of British Indestructo Glass, Ltd.

THE DUKE OF KENT was unable to fulfil his engagement on Wednesday to open the new Bolsover plant of Low Temperature Carbonisation, Ltd., the largest in the world for the manufacture of smokeless fuel. He has postponed his visit for this purpose to a future date.

SIR BERNARD E. GREENWELL and MR. A. W. BOLDEN have joined the board of Davey, Paxman and Co. (Colchester), Ltd., in place of Mr. F. Jarrett and Mr. J. D. Dean, who have resigned. Both Sir Bernard Greenwell and Mr. Bolden are well known in financial and commercial circles, being chairmen and directors of many prominent companies.

PROFESSOR SODDY, the retiring professor of chemistry at Oxford University, opposed a statute which was introduced by Sir Farquhar Buzzard at a congregation on December 1, the object of the statute being to change the professor's duties, with a definite turn towards physical chemistry rather than inorganic chemistry. The statute was approved and Sir Farquhar said that the sub-faculty of chemistry had been unanimous about the change. Professor Soddy said that he opposed the statute on the ground that a professor of physical chemistry needed a laboratory, but the University had made no effort to provide one. In consequence, he suggested that it would be better to confine the duties of the new professor to inorganic chemistry.

MR. FREDERICK BARKER, bleacher and dyer, of Rochdale Old-Road, Heywood, Lancashire, left estate valued at £14,613 gross, with net personalty £12,848.

MR. HARRY ALFRED RICHARDSON, of Chislehurst, Kent, a director of Hick, Hargreaves and Co., engineers, of Bolton, left £42,705, net personalty £39,568.

DR. R. H. PICKARD, president of the Institute of Chemistry and chairman of the Chemical Council, has been elected an honorary member of the Society of Public Analysts.

SIR HENRY HALL, of Brookside, Chester, who had a distinguished career as Chief Inspector of Mines in the Home Office Department, died on Tuesday in his 91st year. Sir Henry was interested in the scientific side of mining and was a pioneer in experiments to prove that road dust was a more serious factor in colliery explosions than fire damp. This discovery led to legislation, which saved many lives.

MR. ROBERT S. BROWN, a director of the Brimsdown Lead Co., the Brough Lead Co., and Goodlass, Wall and Lead Industries, died on December 1, after a short illness. The funeral at St. Marylebone Cemetery, East Finchley, was attended by Mr. W. K. Davey, Mr. J. Rochester and others representing the Brimsdown Lead Co., Mr. C. A. Klein, Mr. J. L. McConnell, Mr. Rowland Cookson, and Mr. W. Singleton, representing Goodlass, Wall and Lead Industries, and Mr. W. A. R. Farmiloe representing T. and W. Farmiloe.

Chemical Notes from Foreign Sources

Estonia

FOLLOWING SUCCESSFUL LABORATORY TRIALS, regular production of acetone from shale oil on an experimental scale is now being undertaken by the Estonian Shale Oil Co.

Czechoslovakia

THE "BIOCHEMA" CHEMICAL LABORATORIES CO. has been formed in Brunn, jointly by an agricultural marketing and a co-operative society, for the production of chemicals for agriculture. Its capital is equivalent to £115,000.

Belgium

AMONG THE PRODUCTS MANUFACTURED by the S.A. de la Vieille Montagne in 1935 were 1.99 tons of thallium sulphate, 272 tons of cadmium, 31 tons of silver and 27,500 tons of refined lead.

Hungary

SODIUM HYDROXIDE MANUFACTURE will be commenced in the near future by the Peter Nitrogen Fertiliser Works.

A NEWLY FORMED CHEMICAL CONCERN, Propanon Chemical Works, Budapest, contemplates the manufacture of acetic acid, acetone, formaldehyde and essential oils.

THE ANNUAL CELLULOSE PRODUCTION of the new Csepel factory of the Nemenyi concern, which is being constructed at a cost of 4 to 5 million pengo, will be in the neighbourhood of 1,200 wagons and will considerably reduce Hungarian imports of cellulose formerly obtained from Austria, Germany and Czechoslovakia.

CO-OPERATION BETWEEN GERMAN AND HUNGARIAN INDUSTRIES will characterise a new works for fat-alcohol and its by-products. The parties to the agreement are Geroe and Dr. Ofner, of Budapest, and the Dusseldorf firms, Deutsche Hydrierwerke and Henckel. The produce of the new factory is intended for sale to the textile, leather and fur industries of the Balkans for finishing purposes.

Finland

THE JOKELA MATCH WORKS (non-combine) achieved a net profit in 1935 of 456,000 Finnish marks (against 440,000 marks in the previous year).

Austria

A NEW SUGAR REFINING WORKS under the name of Niederösterreichische Zuckerfabriks A.G. is being sponsored by the seven existing Austrian sugar producers.

NEGOTIATIONS ARE PROCEEDING between an English-Dutch finance group and holders of certain Austrian and German patents for establishment of a cellulose wool factory in Vienna.

Germany

A NEW CELLULOSE WOOL MANUFACTURING CONCERN, the Rheinische Zellwolle A.G., has been established in Cologne with a capital of 600,000 marks which it is understood will shortly be increased to 4 million marks. Several textile and banking firms are participating in the formation and the new concern will take over the works erected some years ago by the Bemberg concern at Wuppertal-Barmen, but which were never actually used.

Jugoslavia

THE ZUPA COMPANY has been established at Krusevac, with a capital of 5 million dinar, for the manufacture of chemical products.

NEGOTIATIONS ARE PROCEEDING between an English group and the Jugoslavian Wood Distillation Co., of Teslic, for the construction of a large nitric acid works.

IMPORT DUTIES ARE ABOLISHED by decree on all chemicals used in the concentration of ores by the flotation system, or in the separation of metals from their ores. The reason given is that these substances are not at present produced in Jugoslavia.

Weekly Prices of British Chemical Products

IN the rubber chemical market, the price of cadmium sulphide has been advanced by 2d. per lb., while lampblack has dropped by £1 per ton. In the coal tar products section there have been advances in the prices of pure toluol and the 90/140 and 90/180 grades of pyridine; on the other hand the price of pitch has been reduced from 35s. to 34s. per ton. There are no price changes to report in the markets for heavy chemicals, wood distillation products, pharmaceutical and photographic chemicals, perfumery chemicals, essential oils and intermediates.

MANCHESTER.—The constitutional developments of the past week has not been without their influence on the chemical trade in the Manchester area owing to the general feeling of nervousness and uncertainty that has arisen. Actual fresh business that has been placed locally has been on moderate lines, with a fair inquiry in circulation in connection with contracts over 1937 for a wide range of materials. There has been a quietly steady movement of textile chemicals into consumption locally and also in the West Yorkshire areas, and delivery specifications for chemicals generally have been maintained at much about the recent level. In the coal tar products section little improvement has occurred in the demand for pitch but in the case of the bulk of the light materials it is reported that good forward sales have been made recently and the call for supplies is satisfactory.

GLASGOW.—Considerable activity is taking place in the Scottish heavy chemical market and most merchants are exceedingly busy with contract work for the year 1937. Export business has remained very quiet. Prices generally continue steady at about previous figures, with only slight changes to report. There has been a fair volume of business in coal tar products during the week, and prices of all lighter fractions continue firm. Creosote and other oils have been in greater demand. The B.S.I. quality shows an advance of ¼d. per gal. on last week's quotations, while fresh inquiries have also had a stabilising effect upon washed oils and special high tar acid fractions. Some forward buying in cresylic acid would seem to indicate that the present high value is likely to hold. Crude benzol, motor spirit and naphthas are moving in fair quantities. Pitch continues rather dull for the season.

General Chemicals

ACETONE.—£62 to £65 per ton; SCOTLAND: £64 to £65 ex wharf, according to quantity.

ACID, ACETIC.—Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £32 5s. to £34 5s.; tech., 40%, £16 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £32 5s.; tech., 80%, £30 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £27 per ton; crystal, £28; powdered, £29; extra finely powdered, £31; packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. B.P. cryst., £36; B.P. powder, £37. SCOTLAND: Crystals, in 1 cwt. bags, £28; powdered, in 1 cwt. bags, £29.

ACID, CHROMIC.—9¼d. per lb., less 2½%; d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 11¾d. SCOTLAND: B.P. crystals, 1s. per lb., less 5%.

ACID, CRESYLIC.—97/99%, 3s. 2d. to 3s. 3d. per gal.; pale, 98%, 3s. 1d. to 3s. 2d.; dark, 2s. 6d. to 2s. 7d.; 99/100%, refined, 3s. 7d. to 3s. 9d. per gal. MANCHESTER: 99/100%, pale, 3s. 5d.

ACID, FORMIC.—85%, in carboys, ton lots, £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50: pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—£48 15s. to £57 10s. per ton, according to packages and position. SCOTLAND: £2 9s. 6d. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. SCOTLAND: 11¾d. less 5%. MANCHESTER: 11¾d. per lb.

ALUM.—SCOTLAND: Ground, £10 2s. 6d. per ton; lump, £9 12s. 6d.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM SULPHATE.—Neutral quality. 20.6% nitrogen, £7 5s. per ton.

ANTIMONY OXIDE.—SCOTLAND: £61 to £65 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 ex store. MANCHESTER: White powdered Cornish £17 10s. ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—£11 per ton.

BARYTES.—£6 to £7 10s. per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.a. London.

BLEACHING POWDER.—Spot, 35/37%. £8 15s. per ton in casks, special terms for contracts. SCOTLAND: £9.

BORAX COMMERCIAL.—Granulated, £14 10s. per ton; crystal £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots. SCOTLAND: Granulated, £14 10s. per ton in 1 cwt. bags, carriage paid.

CADMIUM SULPHIDE.—4s. 3d. to 4s. 5d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. SCOTLAND: 70/75% solid, £5 10s. per ton net ex store.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¾d. per lb. LONDON: 4½d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 2¾d. per lb.; liquor, £19 10s. per ton d/d

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 19s. 6d. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £24 10s. per ton. SCOTLAND: 40%. £25 to £28 ex store.

IODINE.—Resublimed B.P., 5s. 1d. per lb.

LAMPBLACK.—£22 to £23 per ton.

LEAD ACETATE.—LONDON: White, £33 15s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £35 10s., brown, £34.

LEAD NITRATE.—£32 10s. to £34 10s. per ton.

LEAD, RED.—SCOTLAND: £35 per ton less 2½%, carriage paid, for 2-ton lots.

LEAD, WHITE.—SCOTLAND: £40 per ton, carriage paid. LONDON: £41.

LITHOPONE.—30%, £16 to £16 5s. per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

PHENOL.—6¾d. to 7¼d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 4¼d. per lb. MANCHESTER: £38 per ton.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P. 4s. 3d. per lb.

POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¼d. per lb. SCOTLAND: B.P. Crystals, 8¼d. MANCHESTER: B.P. 10¼d. to 11¼d.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 7¼d. to 8d. per lb. SCOTLAND: 7d. net, in casks, ex store. MANCHESTER: Yellow, 6¾d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—LONDON: £21 per ton. SCOTLAND: £17 15s. per ton net ex store.
SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: £12 10s. per ton in 1 cwt. kegs, £10 15s. per ton in 2 cwt. bags. MANCHESTER: £10 10s.
SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lb. less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. SCOTLAND: 4d., less 5% carriage paid.
SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.
SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.
SODIUM CHLORATE.—£29 per ton. SCOTLAND: £1 10s. per cwt.
SODIUM CHROMATE.—4d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10; photographic, £14 10s.
SODIUM IODIDE.—B.P., 6s. per lb.
SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.
SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.
SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£13 per ton.
SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 4¼d. to 4½d.
SODIUM SILICATE.—140° Tw. Spot, £8 per ton. SCOTLAND: £8 10s.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material, £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d. to £3 5s.
SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.
SODIUM SULPHITE.—Pea crystals, spot, £13 5s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.
SULPHATE OF COPPER.—MANCHESTER: £17 10s. per ton f.o.b. SCOTLAND: £17 15s. per ton less 5%.
SULPLUR.—£9 to £9 5s. per ton. SCOTLAND: £8 to £9.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 5s. 1d. per lb. in 1-cwt. lots.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.
ZINC SULPHIDE.—10d. to 11d. per lb.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Neutral quality, basis 20.6 per cent. nitrogen, delivered in 6-ton lots to farmer's nearest station, December, £7 0s. 6d. per ton; January, 1937, £7 2s. per ton; February, £7 3s. 6d. per ton; March to June, £7 5s. per ton.
CALCIUM CYANAMIDE.—December, £7 per ton; January, 1937, £7 1s. 3d. per ton; February, £7 3s. 6d. per ton; March, £7 3s. 9d. per ton; April to June, £7 5s. per ton, carriage paid to any railway station in Great Britain in lots of four tons and over.
NITRO-CHALK.—£7 5s. per ton for delivery to end of June, 1937.
NITLATE OF SODA.—£7 12s. 6d. per ton for delivery up to end of June, 1937.
CONCENTRATED COMPLETE FERTILISERS.—£10 12s. to £11 1s. per ton for delivery up to end of June, 1937, delivered in 6-ton lots to farmer's nearest station.
AMMONIUM PHOSPHATE FERTILISERS.—£10 5s. to £13 15s. per ton for delivery up to end of June, 1937, delivered in 6-ton lots to farmer's nearest station.

Coal Tar Products

ACID, CRESYLIC.—97/99%, 3s. 2d. to 3s. 3d. per gal.; 99/100%, 3s. 6d. to 4s. per gal., according to specification; pale 99%, 3s. 4d. to 3s. 5d.; dark, 2s. 9d. to 2s. 10d. GLASGOW: Pale, 99/100%, 3s. to 3s. 6d. per gal.; pale, 97/99%, 2s. 6d. to 2s. 9d.; dark, 97/99%, 2s. 5d. to 2s. 8d.; high boiling acids, 1s. 8d. to 2s.; American specification, 2s. 9d. to 3s.
ACID, CARBOLIC.—Crystals, 6¾d. to 7¼d. per lb.; crude, 60's, 2s. 7d. to 2s. 9d. per gal. MANCHESTER: Crystals, 6¾d. to 7d. per lb.; crude, 2s. 8d. per gal. GLASGOW: Crude, 60's, 2s. 6d. to 2s. 9d. per gal.; distilled, 60's, 2s. 9d. to 3s. 3d.
BENZOL.—At works, crude, 8½d. to 9d. per gal.; standard motor 1s. 2d. to 1s. 2½d.; 90%, 1s. 3d. to 1s. 3½d.; pure, 1s. 7d. to 1s. 7½d. LONDON: Motor, 1s. 3½d. GLASGOW: Crude, 9d. to 10d. per gal.; motor, 1s. 2d. to 1s. 3d.
CREOSOTE.—B.S.I. Specification standard, 5¾d. to 6d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North: 5d. London. MANCHESTER: 4½d. to 5½d. GLASGOW: B.S.I. Specification 5½d. to 5¾d. per gal.; washed oil, 4½d. to 4¾d.; lower sp. gr. oils, 4¾d. to 5d.
NAPHTHA.—Solvent, 90/160%, 1s. 5½d. to 1s. 6½d. per gal.; 95/160%, 1s. 7d.; 90%, 1s. to 1s. 2d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. GLASGOW. Crude, 5½d. to 6d. per gal.; 90% 160, 1s. 4½d. to 1s. 5½d.; 90% 190, 1s. to 1s. 1d.
NAPHTHALENE.—Crude, whizzed or hot pressed, £12 to £13 per ton; purified crystals, £20 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. GLASGOW: Fire lighter, crude, £7 to £7 10s. per ton (bags free).
PYRIDINE.—90/140%, 8s. to 9s. 6d. per gal.; 90/180, 2s. 3d. to 2s. 6d. GLASGOW: 90% 140, 7s. to 8s. per gal.; 90% 160, 5s. to 6s.; 90% 180, 2s. 6d.
TOLUOL.—90%, 2s. per gal.; pure, 2s. 5d. GLASGOW: 90%, 120, 1s. 10d. to 1s. 11d. per gal.
PITCH.—Medium, soft, 34s. per ton, in bulk at makers' works. MANCHESTER: 32s. 6d. to 35s. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 30s. to 35s. per ton; in bulk for home trade, 32s. 6d.
XYLOL.—Commercial, 2s. 1d. per gal.; pure, 2s. 3d. GLASGOW: Commercial, 1s. 11d. to 2s. per gal.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 10s. to £9 per ton; grey, £10 10s. to £11. Liquor, brown, 30° Tw., 6d. to 8d. per gal. MANCHESTER: Brown, £9 10s.; grey, £11 10s.
CHARCOAL.—£5 5s. to £10 per ton, according to grade and locality.
METHYL ACETONE.—40-50%, £45 to £48 per ton.
WOOD CREOSOTE.—Unrefined 6d. to 1s. 6d. per gal., according to boiling range.
WOOD, NAPHTHA, MISCIBLE.—2s. 9d. to 3s. 3d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.
WOOD TAR.—£2 to £3 per ton.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 8d. per lb.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100%, d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZIDINE, HCl.—2s. 5d. per lb., 100% as base, in casks.
o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.
p-CRESOL 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.
m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8d. per lb.
DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 10½d.
DINITROCHLORBENZENE, SOLID.—£72 per ton.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works
β-NAPHTHOL.—In bags, £88 15s. per ton; in casks, £89 15s.
α-NAPHTHYLAMINE.—Lumps, 1s. per lb.; ground, 1s. 0½d.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works in casks.
o-NITRANILINE.—3s. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.

Latest Oil Prices

LONDON, December 9.—LINSEED OIL was steady. Spot, £28 10s. per ton (small quantities), Dec., £26; Jan.-April, 25 17s. 6d.; May-Aug., £26; Sept.-Dec., £26 5s., naked. SOYA BEAN OIL was firm. Oriental (bulk), ex tank, spot, Rotterdam, £30 per ton, nominal. RAPE OIL was steady. Crude, extracted, £33 10s. per ton; technical refined, £34 10s., naked, ex wharf. COTTON OIL was dearer. Egyptian crude, £30 per ton; refined common edible, £33; deodorised, £35, naked, ex mill (small lots, £1 10s. extra). TURPENTINE was easier. American, spot, 41s. per cwt.
HULL.—LINSEED OIL, spot, quoted £26 10s. per ton; Dec., Jan.-April and May-Aug., £26. COTTON OIL, Egyptian, crude, spot, £30 10s.; edible, refined, spot, £32 10s.; technical, spot, £32 10s.; deodorised, £34 10s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £33, naked. GROUNDNUT OIL, extracted, spot, £34; deodorised, £37. RAPE OIL, extracted, spot, £33; refined, £34. SOYA OIL, extracted, spot, £31 10s.; deodorised, £34 10s. per ton. COD OIL, f.o.r. or f.a.s., 25s. per cwt., in barrels. CASTOR OIL, pharmaceutical, 44s. 6d. per cwt.; first, 39s. 6d.; second, 37s. 6d. TURPENTINE, American, spot, 43s. 3d. per cwt.

Inventions in the Chemical Industry

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Open to Public Inspection

RECEPTACLE FOR LIQUEFIED GAS.—Flaschengas-Geräte Ges. May 29, 1935. 24035/35.

MANUFACTURE OF SAPONACEOUS ORGANIC SULPHIDES.—Henkel and Cie, Ges. May 25, 1935. 8251/36.

MANUFACTURE OF PLASTIC MASSES derived from polyvinyl chlorides.—I. G. Farbenindustrie. May 25, 1935. 10971/36.

SOLUTIONS FOR USE IN COATING METALS.—Pyrene Co., Ltd. May 24, 1935. 11525/36.

DISTILLATION.—Lummus Co. May 28, 1935. 11956/36.

RESPIRATORY APPARATUS for protection against noxious gases.—J. L. Guillemin. May 28, 1935. 12721/36.

FORMATION OF ESTERS.—Continental Oil Co. May 27, 1935. 13481/36.

PRODUCTION OF SULPHURIC ACID.—Grasselli Chemical Co. May 24, 1935. 13603/36.

NAPHTHA-REFORMING.—Houdry Process Corporation. May 27, 1935. 13678/36.

PRODUCTION OF A CONCENTRATED CHROMIUM MATERIAL.—A. Hammarberg. May 24, 1935. 14313/36.

MANUFACTURE OR USE OF AQUEOUS SOLUTIONS OF PHENOLS, their homologues, and derivatives.—Deutsche Hydrierwerke, A.-G. May 25, 1935. 14727/36.

PROCESS FOR PRODUCING CLEAR AQUEOUS SOLUTIONS OF ANIMAL, vegetable, or synthetic lipoids.—I. G. Farbenindustrie. May 24, 1935. 14735/36.

COMPOUNDS OF THE ANTHRAQUINONE SERIES and their manufacture.—E. I. du Pont de Nemours and Co. May 24, 1935. 14792/36.

MANUFACTURE OF LUMINESCENT BODIES.—Soc. Francaise Helita. May 27, 1935. 14994/36.

PROCESS FOR THE MANUFACTURE OF DYED CELLULOSIC MATERIALS. I. G. Farbenindustrie. May 31, 1935. 15004/36.

PROCESS FOR THE PRODUCTION OF STARCH-SIZE PRODUCTS.—W. Seck. May 31, 1935. 15020/36.

METHODS AND PLANTS for the hydrogenation of hydrocarbonous substances containing sulphur.—P. Marécaux. May 31, 1935. 15198/36.

Specifications Accepted with Date of Application

ANTHRAQUINONE DYESTUFFS and processes for their manufacture.—Chemical Works, formerly Sandoz. March 21, 1934. 457,386.

MANUFACTURE OF DYESTUFFS and intermediate products of the anthraquinone series.—W. W. Groves (I. G. Farbenindustrie). April 18, 1935. 457,196.

RECOVERY OF CONDENSIBLE VAPOURS and the like from active carbon or other solid adsorbents.—E. R. Sutcliffe. April 18, 1935. 457,197.

DESTRUCTIVE HYDROGENATION OF COAL.—H. E. Potts (International Hydrogenation Patents Co., Ltd.). April 23, 1935. 457,198.

DEVELOPMENT OF SILVER-HALIDE EMULSIONS in colour.—W. W. Groves (I. G. Farbenindustrie). April 25, 1935. 457,326.

METHODS AND DEVICES for the removal of liquids containing solid materials and possibly gases from high-pressure chambers.—F. Uhde. April 26, 1934. 457,447.

PROCESS FOR THE MANUFACTURE OF ACID WOOL DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie). April 27, 1935. 457,448.

CRYSTALLISATION OF DEXTROSE.—International Patents Development Co. April 1, 1935. 457,449.

PROCESS OF PRINTING from a lenticular film on to another lenticular film.—W. W. Groves (I. G. Farbenindustrie). May 24, 1935. 457,278.

MANUFACTURE OF DYES and process for sensitising photographic silver-halide emulsions.—Gevaert Photo Production N.V. July 21, 1934. 457,450.

MANUFACTURE OF SUBSTIUTED MALONIC ESTERS.—J. D. Kendall. May 25, 1935. 457,335.

CONCENTRATION OF RUBBER LATEX.—A. T. B. Kell. May 27, 1935. 457,455.

MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. May 26, 1934. 457,458.

PROCESS FOR THE MANUFACTURE OF 4-ALKYL-5-HYDROXY-ALKYLTHIASOLES.—A. Carpmael (I. G. Farbenindustrie). May 13, 1935. 456,751.

PROCESS FOR THE MANUFACTURE OF DIAZOTIZABLE AZO DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie). May 14, 1935. 456,756.

PROCESS FOR THE MANUFACTURE OF DIAZOTISING AZO DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie). May 14, 1935. 456,535.

PROCESS OF SEPARATING RESINS from natural guttapercha and like materials.—E. W. Fawcett, and Imperial Chemical Industries, Ltd. May 14, 1935. 456,757.

MANUFACTURE OF FLUORINE COMPOUNDS.—A. Carpmael (I. G. Farbenindustrie). May 15, 1935. 456,536.

PROCESS FOR THE MANUFACTURE OF POLYAZO DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie). May 15, 1935. 456,768.

MANUFACTURE AND PRODUCTION OF MAGNETISABLE ALLOYS.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie). May 16, 1935. 456,823.

MANUFACTURE OF 1:2:3:4-TETRAHYDRO-3-OXY-QUINOLINE DERIVATIVES.—I. G. Farbenindustrie. May 16, 1934. 456,824.

ADHESIVE AND WATERPROOFING COMPOSITIONS, and the use thereof.—C. G. Dreymann. May 17, 1934. 456,820.

APPARATUS FOR DEGREASING by means of volatile solvents.—N. R. Hood, and Imperial Chemical Industries, Ltd. May 16, 1935. 456,821.

MANUFACTURE OF FLOOR COVERINGS and like materials.—F. T. Walker, A. C. Hetherington, and Imperial Chemical Industries, Ltd. May 16, 1935. 456,829.

METHOD OF SEPARATING THE CONSTITUENTS OF GASEOUS MIXTURES. Air Reduction Co., Inc. Aug. 1, 1934. 456,773.

PROCESS OF TREATING HYDROCARBONS.—W. O. Mitscherling. May 24, 1935. 456,537.

PRODUCTION OF DEXTROSE.—International Patents Development Co. April 17, 1935. 456,590.

GAS PRODUCERS for the continuous preparation of water gas.—Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie). June 4, 1935. 456,671.

METHOD OF MAKING TITANIUM DIOXIDE.—American Zinc, Lead and Smelting Co. July 12, 1934. 456,544.

CONVERSION OF ETHERS TO ALCOHOLS.—Standard Oil Development Co. December 28, 1934. 456,547.

ASPHALTIC MATERIAL and process for producing the same.—Standard Oil Co. of California. August 11, 1934. 456,600.

MANUFACTURE OF SEED DISINFECTANT PREPARATIONS.—Schering-Kahlbaum, A.-G. Sept. 28, 1934. 456,782.

FLUORESCENT LAYERS.—Naamlooze Vennootschap Philips' Gloeilampenfabrieken. Feb. 5, 1935. 456,480.

PROCESS AND APPARATUS FOR CALCINING LITHOPONE.—Sachtleben A.-G., Für Bergbau und Chemische Industrie. Feb. 21, 1935. 456,486.

PROCESS FOR THE MANUFACTURE OF HIGHLY POROUS SILICA-LIME STONES.—J. Albert. March 17, 1936. 456,562.

PROCESS FOR THE MANUFACTURE OF ORGANIC CHLORINE and bromide derivatives.—Dr. C. Hunsdiecker, Dr. H. Hunsdiecker, and Dr. E. Vogt. April 8, 1935. 456,565.

PRODUCTION OF CHLORINE DIOXIDE.—L. Mellersh-Jackson. (Mathieson Alkali Works). May 28, 1936. 456,569.

PROCESS OF SOFTENING UNPURIFIED WATER.—I. G. Farbenindustrie. June 15, 1935. 456,571.

ADSORPTION OR ABSORPTION PROCESSES.—Carbo-Union Verwaltungs-Ges. June 24, 1935. 456,506.

POLYESTER COMPOUNDS and methods of making and using same. Standard Oil Development Co. Oct. 25, 1934. 456,934.

METHOD OF AND APPARATUS FOR CLARIFYING WATER.—Maschinenfabrik Buckau R. Wolf A.-G. Jan. 3, 1935. 457,149.

RECOVERY FROM AMMONIUM COMPOUNDS from ammoniacal liquors or the like, and the manufacture of a grease solvent.—A. G. Black, and P. Evans. Jan. 7, 1936. 457,082.

PROCESS FOR THE MANUFACTURE OF ALIPHATIC PRIMARY AMINES.—Usines de Melle. Feb. 19, 1935. 456,952.

PRODUCTION OF LOW MOLECULAR WEIGHT OLEFINE POLYMERS.—Standard Oil Development Co., and I. G. Farbenindustrie. June 4, 1935. 457,158.

PLANT FOR THE MANUFACTURE OF TARRY, bituminous, and analogous emulsions.—Compagnie Industrielle et Miniere du Nord et des Alpes. March 18, 1935. 456,955.

PRODUCTION OF PHOSPHORIC ACID.—Aktiebolaget Kemiska Patenter. April 9, 1935. 457,163.

PROCESS FOR THE MANUFACTURE OF ACID AZO DYESTUFFS, in particular for the dyeing and printing of animal textile fibres.—Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann. April 2, 1935. 456,957.

SOLVENT EXTRACTION OF LOWER BOILING HYDROCARBONS.—Standard Oil Development Co. Sept. 10, 1935. 456,958.

PROCESS FOR THE MANUFACTURE OF NON-POISONOUS PROTECTIVE GASES for industrial purposes.—Non-Poisonous Gas Holding Co., Ltd. Jan. 29, 1936. 456,873.

PROCESS FOR THE MANUFACTURE OF SODIUM N-methyl-C, C-allyl-isopropyl-barbiturate in a stable, dry state, readily soluble in water.—F. Hoffmann-La Roche and Co., A.-G. May 16, 1935. 456,876.

PROCESS FOR THE MANUFACTURE OF 2, 4-dioxo-3, 3-dialkyl-tetrahydro-pyridines.—F. Hoffman-La Roche and Co., A.-G. June 17, 1935. 457,012.

PRODUCTION FROM WHALE BLOOD OF BLOOD MEAL suitable for use as a feeding stuff for animals.—Soc. Anon. des Brevets Fauth. May 28, 1935. 456,882.

RECOVERY OF MAGNESIUM from magnesium oxides.—Wacker Ges. Fur Elektrochemische Industrie, Ges. May 22, 1935. 457,009.

PREPARATION OF *a*-METHYLACROLEIN.—Rohm and Haas, A.-G. May 18, 1935. 457,174.

PROCESSES OF TREATING VEGETABLE FIBROUS MATERIAL for the production of cellulose fibre or pulp.—F. R. Chesley, jun. June 13, 1935. 457,171.

Applications for Patents

(November 5 to 18 inclusive.)

TANNING-AGENTS.—I. G. Farbenindustrie. (Germany, Nov. 23, '35.) 31444.

MANUFACTURE OF SULPHANIC ACID.—Imperial Chemical Industries, Ltd. 31375.

MANUFACTURE OF SULPHUR CONDENSATION PRODUCTS.—Imperial Chemical Industries, Ltd., and R. F. Goldstein. 31459.

TREATMENT OF FATTY ACIDS from oxidation products of non-aromatic hydrocarbons of high molecular weight.—G. W. Johnson (I. G. Farbenindustrie). 30937.

COMPOUNDS OF THE ANTHRAQUINONE SERIES.—G. W. Johnson (I. G. Farbenindustrie). 31062.

AZO DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie). 31063.

DYESTUFFS OF THE PHTHALOCYANINE SERIES.—G. W. Johnson (I. G. Farbenindustrie). 31064.

ALCOHOLS OF HIGH MOLECULAR WEIGHT.—G. W. Johnson (I. G. Farbenindustrie). 31580.

ADDITION COMPOUNDS OF VINYL KETONES.—G. W. Johnson (I. G. Farbenindustrie). 31581.

MANUFACTURE OF DEODORISING COMPOUNDS.—W. C. Kemp. 31222.

DYESTUFFS.—J. D. Kendall. 31191, 31192.

MANUFACTURE OF BARIUM SULPHATE.—B. Laporte, Ltd., and W. S. Wood. 31293.

BOILER WATER CONDITIONERS, ETC.—J. E. Pollak (Electro-Chemical Engineering Corporation). 31340.

4.6-DIAMINO-2-ALKYL PYRIDINES.—H. J. Schneiderwirth.

CONVERSION OF ORGANIC SUBSTANCE INTO FINE POWDER.—C. Fostiropol, and R. Verona. (Roumania, Nov. 18, '35.) 31647.

CONVERTION OF ORGANIC SUBSTANCE INTO FINE POWDER.—C. Fostiropol. (Roumania, May 20.) (Cognate with 31647.) 31648.

MANUFACTURE OF ARTIFICIAL MASSES from polyvinyl chloride.—W. W. Groves (I. G. Farbenindustrie). 30933.

MANUFACTURE OF POLYVINYL CHLORIDE POLYMERIZATES.—W. W. Groves (I. G. Farbenindustrie). 31292.

DISAZO-DYESTUFFS INSOLUBLE IN WATER.—W. W. Groves (I. G. Farbenindustrie). 31296.

MANUFACTURE OF SILVER HALIDE EMULSIONS.—W. W. Groves (I. G. Farbenindustrie). 31588.

PRODUCTION OF OIL from whales, etc.—D. A. Hansen. (July 2, '35.) 30968.

TREATMENT OF LIGNO CELLULOSE MATERIALS.—L. G. S. Hebbs. 31620.

PROCESS FOR THE ELECTROLYSIS of sulphate solutions.—I. G. Farbenindustrie. (Germany, Feb. 20.) 31104.

AGENTS FOR TREATING LUBRICANTS.—I. G. Farbenindustrie. (United States, March 3.) 31472.

PRODUCTION OF CATALYSTS.—Standard Oil Development Co. (United States, Dec. 31, '35.) 31105.

PRODUCTION OF CATALYSTS.—Standard Oil Development Co. (United States, Jan. 28.) 31106.

MANUFACTURE OF VOLATISED PRODUCTS from mineral oils.—Standard Oil Development Co. (United States, Jan. 11.) 31107.

POLYMERISATION OF OLEFINES.—Standard Oil Development Co. (United States, Dec. 31, '35.) 31467.

TREATMENT OF LINSEED OIL, ETC.—E. Willmeroth, and R. Worth. (Germany, Nov. 12, '35.) 30966.

TREATMENT OF LINSEED OIL, ETC.—E. Willmeroth, and H. Bihrisch. (Germany, Jan. 2.) 30967.

MANUFACTURE OF ALKALI METALS, ETC.—T. Wood. 30853. (Germany, Jan. 29, '35.) 31143.

LIQUID-COATING COMPOSITIONS.—Birkbys, Ltd., and A. J. Buck. 31786.

MANUFACTURE OF ESTERS OF OESTRADIOL.—A. G. Bloxam (Soc. of Chemical Industry in Basle). 32136.

MANUFACTURE OF COMPOUNDS OF ANDROSTANE AND PREGNANE SERIES.—A. G. Bloxam. 32267.

MANUFACTURE OF ALKALI METAL CYANIDES.—L. J. Burrage. 32205.

LIQUID FUEL FOR INTERNAL-COMBUSTION ENGINES.—C. C. Callis. 32116.

PLASTIC COMPOSITIONS.—S. H. Colton and A. G. Rodwell. 31880.

ELECTROLYTIC PRODUCTION OF SODIUM, ETC., METALS.—E. I. du Pont de Nemours and Co. (United States, Nov. 20, '35.) 31872.

MANUFACTURE OF DICYANDIAMIDE, ETC.—E. E. Dutt. 31680.

TREATMENT OF ZEOLITE MINERALS.—E. E. Dutt, C. Downs, and J. C. Mance. 32045.

LEAD ALLOYS.—Goodlass Wall and Lead Industries, Ltd., and W. T. Butcher. 32165.

LEAD ALLOYS.—Goodlass Wall and Lead Industries, Ltd., and W. T. Butcher. (Aug. 8.) 32166.

PROCESS FOR IMPARTING HYDROPHOBIC PROPERTIES TO FIBROUS MATERIALS, ETC.—W. W. Groves. (Germany, Nov. 23, '35.) 32028.

MANUFACTURE OF POLYMETHINE ALDEHYDES.—W. W. Groves (I. G. Farbenindustrie). 31704.

Chemical and Allied Stocks and Shares

THERE has been a falling off of business in the stock and share markets, pending a settlement of the constitutional crisis. Prices of leading industrial shares have in many cases reacted sharply on balance, but at the time of writing the lower prices are attracting buyers. Shares of chemical and allied companies have been relatively well maintained. Imperial Chemical are 42s., compared with 32s. 9d. a week ago and B. Laporte have remained at 127s. 6d. William Blythe were again around 7s. 6d. Distillers, which lost a good part of their recent further advance, have gone back to 115s. 3d. at the time of writing, but the market is continuing to budget for a larger dividend or a bonus of some kind for the current financial year. It is, however, not generally believed there will be any change in the interim dividend which falls to be declared early in the new year. Goodlass Wall at 14s. 9d. are within 3d. of the price ruling a week ago, and dividend estimates maintained a steady tendency in Blythe Colour Works and Cellon. International Combustion benefited from market hopes of an increase in dividend to 25 per cent. and Cannon Iron Foundries were active around 23s. on expectations of a larger distribution for the year.

Sangers were higher at 28s. 3d. in response to the possibility of an increased interim dividend. Boots Pure Drug were little changed at 57s. 9d. and Timothy Whites and Taylors, although lower on the week at 33s. 6d., have been active, aided by the statements at the recent meeting that it is the intention to make two interim dividend payments during the current financial year. South African Druggists were active on the belief that the initial results will be issued during the next few weeks.

United Molasses were lower at 24s. 3d. owing to the reference in the report to the lower price of molasses. The increased profits for the past year are attributed to higher tanker freight rates. If profits had been distributed to the hilt, the dividend on the ordinary capital could have been 20 per cent., so the 14 per cent. payment proposed is conservative. Turner and Newall reacted rather sharply to 105s. 6d., but recovered later, the disposition being to await the meeting for references as to prospects and confirmation or otherwise of recent market reports that further important new uses of asbestos have been discovered.

The 1s. shares of Petroleum Storage and Finance have been active up to 23s. on continued anticipations that the results, due next month, may announce a high rate of dividend. Wall Paper deferred have remained at the lower level of 41s. 10½d. to which they went recently. Triplex Safety Glass reacted at one time but later showed recovery to 144s. 4½d., it being pointed out that on the basis of last year's 60 per cent. dividend a relatively favourable yield is offered, particularly as, according to many views, a bonus of some kind can be expected on these 10s. shares sooner or later. The market is talking of the possibility that a bonus might take the form of a writing up of the nominal value of the shares from 10s. to £1, the level which ruled some years ago before capital was returned to shareholders.

Pinchin Johnson was another share which was assisted by market hopes of a bonus. This hope is based on the statement made at the last meeting that the company has reserves and undivided profits in excess of its requirements. Key Glassworks were steady on the raising of the dividend from 15 per cent. to 16 per cent. The 5s. ordinary shares of Redfern Brothers have been active up to 12s. 6d. since dealings commenced. This is another glass company with a satisfactory dividend record. United Glass Bottle ordinary shares and those of Canning Town Glass Works were steady on hopes of increased dividends for the year. Both companies invariably follow a conservative dividend policy, but the assumption in the market is that the upward movement in their profits is probably continuing.

Dorman Long came in for renewed attention on the statements at the meeting and on the intimation that it is the intention to make an offer of additional shares to shareholders, in which holders of the preference and preferred ordinary will participate as well as holders of the ordinary shares. Other iron and steel shares also showed a better tendency, including Consett Iron and Richard Thomas.

In other directions the 2s. ordinary shares of British Industrial Plastics were active around 3s. and the 4s. shares of British Glues and Chemicals were maintained around 9s. 9d.

Oil shares developed a firmer trend, largely owing to the upward movement in crude oil prices in the United States.

From Week to Week

THE OFFICES of the British Road Tar Association are now at 1 Grosvenor Place, London, S.W.1. (Telephone: Sloane 6119. Telegrams: "Broatar, Knights, London.")

A FOURTH BLAST FURNACE at the works of the Staveley Coal and Iron Co., has now been relit, after being modernised and relined, and the whole plant is now in operation.

THE D'ARCY EXPLORATION CO., LTD., are to erect oil boring plant at Bank Farm, Aislaby. The site selected is half way up the slope between the River Esk and Swarth Howe, which rises 860 ft. to the west of the town.

AN ORDER HAS BEEN MADE by the Treasury under Section 10 (5) of the Finance Act, 1926, exempting isopropyl barbituric acid from Key Industry Duty from December 16, 1936, until December 31, 1937. The Order (Safeguarding of Industries (Exemption) No. 12 Order 1936) will shortly be published by the Stationery Office.

DR. DYSON, of Loughborough College, gave a lecture on "Antimony in Chemistry and Medicine," to members of the chemistry section of the Leicester Literary and Philosophical Society on December 2. Dr. Dyson traced the history of the metal from early times, and showed how knowledge of it spread from India through Arabia to Europe. He told some amusing stories of the use of compounds of antimony in early medicine.

RESOLUTIONS APPROVING THE SCHEME of amalgamations with Anglovaal Portland Cement, Ltd., were unanimously passed at a meeting of the holders of the 5 per cent. convertible debenture stock of Atlas Cement of South Africa, Ltd., and at a subsequent extraordinary meeting of the company on Tuesday. The chairman, Sir Walrond Sinclair, said that a cable had been received stating that the resolutions for amalgamation had been passed at a confirmatory meeting of the shareholders of Anglovaal Portland Cement, Ltd., held in South Africa.

TO MEET THE DEMAND FOR LIGHT-WEIGHT CONCRETE in modern building, the Department of Scientific and Industrial Research advocates the use of "foamed slag." This "foamed slag," according to a report issued by the D.S.I.R., is made by rapidly chilling molten slag from blast furnaces manufacturing pig iron. It is extensively used in Germany, where it is claimed that blocks 50 per cent. larger than clay bricks are only half the weight, and for the same volume are only half the price of clay bricks. The report, entitled "Light-weight Concrete Aggregates," is obtainable from the Stationery Office, price 4d.

THREE NEW PLANTS ARE UNDER CONSIDERATION in British India, for the manufacture of dry ice (solid carbon dioxide), liquid chlorine, and general industrial chemicals. The dry ice plant anticipates the supply of refrigerants to the Army cantonments. The liquid chlorine would be utilised as a sterilising agent for water, sewage and similar needs, and it is believed that 1,500 lb. of liquid chlorine could be manufactured and used daily. Industrial chemical manufacture is represented by the proposal of National Chemical Industries, Ltd., to build works for making 9,000 tons of acids and alkalies per year.

AN INQUEST WAS HELD at Liverpool on December 3, on Albert E. Crompton, aged 33, a bricklayer employed at the Pilkington Sullivan works of Imperial Chemical Industries, Ltd., who was fatally injured through being struck on the head at the works by a falling spanner. According to the evidence a man working on a partition in the aluminium chloride building, to save climbing down, called to a man below to throw the spanner up to him. It struck an intermediate piece of steelwork and fell on Crompton's head. The jury expressed the view that workmen below should decline to take such risks, that a rope or pulley should be used, and a head guard provided for the men working below.

THE TREASURY has made an order under Section 10(5) of the Finance Act, 1926, continuing the exemption from Key Industry Duty until December 31, 1937, of a number of scientific instruments, compounds of rare earth metals, synthetic organic chemicals, analytical reagents, other fine chemicals and chemicals manufactured by fermentation processes, amorphous carbon electrodes and vanadium silica compounds specially prepared for use as catalysts for sulphuric acid manufacture. The Treasury order, which will be entitled the Safeguarding of Industries (Exemption) No. 11 Order, 1936, will shortly be published by the Stationery Office.

THE 1933-35 EDITION of the Imperial Institute's "Statistical Summary of the Mineral Industry of the British Empire and Foreign Countries" has been published. This volume gives statistics of the production, imports and exports by the different countries of the world of 48 minerals, about half of which are metallic. The trade tables refer not only to the crude materials but also to the chief semi-manufactured products and in some cases the principal chemicals and derivatives. At the end of the volume will be found a list of the official publications from which the statistics have been compiled. Copies can be obtained from the Imperial Institute, South Kensington, London, S.W.7, price 8s., post free.

IN ADDITION to the Christmas holidays, the works, warehouses and offices of Howards and Sons, Ltd., will be closed on December 30 and 31, for stocktaking.

THE NATIONAL FEDERATION of Associated Paint, Colour and Varnish Manufacturers has been elected to associate membership of the British Road Federation.

THE LIBRARY OF THE CHEMICAL SOCIETY will be closed for the Christmas holidays from Wednesday, December 23, at 1 p.m., until Tuesday, December 29, at 10 a.m., inclusive.

THE DIRECTORS OF FORD PAPER MILLS, LTD., have received a conditional offer from Wiggins, Teape and Co. (1919), Ltd., to acquire a controlling interest in the company. Particulars of the offer have been circulated to shareholders.

THE STEEL SMELTING SECTION at Bryngwyn Steelworks, Gorseinon, Glamorgan, will restart early in the new year, after seven years' idleness. Three of the five furnaces are to be put into commission. The works are owned by Richard Thomas and Co., the steel and tinplate combine.

THE HENRY SIDGWICK MEMORIAL LECTURE on "Modern Alchemy" delivered by Lord Rutherford at Newnham College, will be published early in the new year in book form, by the Cambridge University Press. The lecture will be somewhat expanded for this purpose, and a number of illustrations will be included.

THE IMPORT DUTIES ADVISORY COMMITTEE has received an application for increases in the import duty on lithopone. Any representations which interested parties may desire to make should be addressed in writing to the Secretary, Import Duties Advisory Committee, Shell-Mex House, Strand, London, W.C.2, not later than December 31.

DUNDEE CORPORATION GAS COMMITTEE has agreed to recommend the appointment of a male analytical chemist at the gasworks in view of the resignation of Miss Margaret B. Foggie, chemist of the department, who has resigned for health reasons. The undertaking is a fairly large one, and the committee wants to get a good man for the post, the salary being between £275 and £375.

LONG AND INTRICATE NEGOTIATIONS for agreement between the sugar refiners and the beet sugar industry are nearing completion, Sir Leonard Lyle, the chairman, told shareholders of Tate and Lyle, at their annual meeting. Sir Leonard added that an agreement would probably be signed at an early date under which it was hoped that the various sugar interests in this country would work together in harmonious collaboration.

THE PETROLEUM PROSPECTING LICENCE which was granted under the Petroleum (Production) Act, 1934, and the Petroleum (Production) Regulations, 1935, to Major C. A. Pogson and Mr. E. H. Cunningham-Craig, carrying on business in partnership as the Midlothian Petroleum Syndicate, has now been assigned to the Anglo-American Oil Co., Ltd., of 36 Queen Anne's Gate, London. The licence is understood to cover about 12 square miles in the county of Midlothian.

THE IMPORT DUTIES ADVISORY COMMITTEE has issued the Import Duties (Drawback) (No. 9) Order amending the Import Duties (Drawback) (No. 3) Order, which provided for the allowance of drawback in respect of soya beans used in the manufacture of soya bean oil as from December 9, 1936. The effect of the amendment is to extend the eligibility for drawback to such oil when exported as an ingredient of canned fish, in the manufacture of which no other oil than soya bean oil has been added.

THE CHEMISTRY OF FOOD was the subject of a lecture given by Dr. Leslie H. Lampitt in the Members' Hall of the Royal Dublin Society, Ballsbridge, recently. He said that his object was to show something of the modern tendencies of the impacts of chemistry not only on the production, but also on the manufacture of food. With the aid of lantern slides he dealt in particular with what he regarded as a great factor in the future, namely, the possible necessity for the standardisation of food from the vitamin point of view. He also dealt with the subject of hormones, which, he said, was only now beginning to be appreciated.

THE BRITISH OXYGEN CO.'S pension fund scheme for sales, clerical and managerial staff has been extended to include the company's workpeople and the staff and workpeople of subsidiary companies in this country. Of the staff, 99.5 per cent. of the men and 85 per cent. of the women employed by the company, and of the workpeople 95 per cent. of the men and 82.5 per cent. of the women have become contributory members of the funds. In the case of the workpeople's fund, members who are paid off on account of lack of work due to bad trade remain members for 24 weeks without contributory payment and continue as such on coming back to work within that period. If any loss is incurred by either fund, it must be made good by the company. Similar funds are being started in the company's allied concerns in Australia, South Africa and India.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ASSOCIATED CLAY INDUSTRIES, LTD. (late Associated Fireclay Companies, Ltd.), London, W.C. (M., 12/12/36.) November 26. £150,000 debenture stock secured by Trust Deed dated November 20, 1936; general charge. *Nil. August 12, 1936.

REX CAMPBELL AND CO., LTD., London, E.C., chemical merchants. (M., 12/12/36.) November 24. £9,000 debentures; general charge. *Nil. December 31, 1935.

Satisfactions

PINKSTONE, LTD., Bristol, manufacturers of veterinary medicines, etc. (M.S., 12/12/36.) Satisfaction November 30, £400, registered April 3, 1914.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

COOPER, SYDNEY GEO., 93 Hatton Garden, E.C., manufacturing chemist. (C.C., 12/12/36.) £16 14s. 8d. November 2.

THORNFIELD, GODFREY, Veletta Road, W.3 (trading as Beaucaire Laboratories), manufacturing chemist. (C.C., 12/12/36.) £21 14s. 0d. October 31.

Companies Winding-up Voluntarily

TRURO COLOR CO., LTD. (C.W.U.V., 12/12/36.) By special resolution, November 27, 1936, Mr. John Weighill Lodge, of Lloyds Bank Chambers, Truro, appointed liquidator.

Company News

British Benzol and Coal Distillation.—The report for the year to October 31 shows a profit of £42,506 (against £18,643); after expenses, interest, tax and depreciation, the net profit is £18,785 (against loss £4,811); this reduces the debit balance forward to £74,119.

Power-Gas Corporation.—The accounts for the year ended September 30 last show a balance of £23,600 (£17,006). The directors have appropriated to reserve £4,700 (£2,000), leaving £18,900, which, with £12,144 brought in, makes £31,044. The directors recommend a dividend of 6 per cent. (5 per cent.), less tax, absorbing £18,000, carrying forward £13,044.

Cleveland Salt.—The report for the year to September 30 last states that after including a profit of £1,063 on sale of investments, the amount available for distribution, after providing for tax, and adding £2,622 brought in, is £3,873; dividend 7½ per cent., tax free, on preference, £900; dividend 7½ per cent., tax free, on deferred, £450; forward, £2,523.

British Burmah Petroleum Co.—The report for the twelve months ended July 31 last discloses a sharp rise in revenue from £14,578 to £43,213. Adding agency and transfer fees, interest, etc., and £65,416, representing a profit on sale of shares, there is a total of £116,314. Sundry charges in Burma, Bombay and London absorbed £15,509 and various fees and salaries £8,296. A sum of £17,980 was required for debenture interest, and after deducting £368 for tax and writing off £21,983 for depreciation, there remains £52,179.

South Durham Steel and Iron Co.—Profits have advanced by £53,837, to the new record of £217,272, in the year to September 30 last. The depreciation provision is increased by £30,000 to £85,000, and £19,440 is required for expenses in connection with the issue last June of 4 per cent. debenture stock. The distribution on the ordinary shares is raised by 1 per cent. to 12 per cent., and the "B" ordinary distribution is increased a similar amount, to 6 per cent. The carry forward at £119,013 compares with £118,455 brought in.

Boots Pure Drug Co.—A further interim dividend at the rate of 24 per cent. per annum, less tax. For the past eight years, interims at a similar rate have been followed by a bonus of 5 per cent., tax free, making a total payment on the £1,600,000 ordinary shares of 29 per cent. The company, of which Lord Trent is chairman, has an authorised and issued capital of £3,000,000.

J. C. and F. Field, Ltd.—An interim on preference shares has been declared at the rate of 7 per cent., less tax, in respect of the half-year ended September 30, payable on December 14.

Ilford Ltd.—This company, which manufactures photographic plates, etc., recommends a dividend of 7 per cent., less tax (same) for the year ended October 31 on ordinary shares.

N. Greening and Sons.—In business as wire manufacturers, this company announces one year's dividend on 5 per cent. preference shares, completing payment to December 31, 1936.

British Oxygen Co.—A final dividend of 3¼ per cent., less tax, for half-year ending December 31, 1936, will be paid to holders of preference stock registered at close of business on December 11.

Key Glass Works.—A final ordinary of 11 per cent. (same), making 16 per cent. (against 15 per cent.), less tax and a preference dividend at rate of 7 per cent. for half-year ended November 20, 1936, less tax, is announced.

Colonial Sugar Refining.—After providing for depreciation and other charges, the company earned a profit of £489,420 for the six months ended September 30, 1936. The total profit for the year to that date amounted to £984,320, compared with £930,240 for previous year. Dividend unchanged at 6½ per cent. on enlarged capital.

Celanese Corporation of America.—The directors have declared a dividend of $1 per share on the 1,000,000 shares of common stock, payable December 23 next. This follows an initial payment of 50 c. per share in April last.

Cannon Iron Foundries.—This company, which was registered in 1935, is to pay a final dividend on the £250,000 ordinary capital of 10 per cent., less tax, making 15 per cent. for the year to September 30 last. For the initial period March 20 to September 30, 1935, the payment was 7½ per cent. The half-year dividend on the 5½ per cent. preference shares will be paid on January 1.

Bradford Dyers' Association.—The directors have decided to pay interest on the 4 per cent. debenture stock, as usual, on January 1 next, and to postpone payment of a dividend on the 5 per cent. cumulative preference stock for the six months ending December 31. Dividend on the £2,549,237 issued 5 per cent. cumulative preference stock are in arrears from the beginning of 1932, and the last payment on the £2,258,794 ordinary stock outstanding was 4 1-6 per cent. (in two dividends) for 1930.

United Molasses Co.—The full report for the year ended September 30, 1936, shows a trading profit for the twelve months of £716,186, which compares with £652,384 in the previous year. The total consolidated profits of the company and its subsidiaries rose from £718,200 to £789,044. The final dividend is at the rate of 10 per cent., which raises the total distribution for the year by 6 per cent. to 14 per cent., less tax, and following allocations to staff funds and an advance of £30,000 to £110,000 in the transfer to reserve, there remains a balance of £49,480 to go forward. The amount brought in from the last accounts was £45,216.

Shell Union Oil Corporation.—It is announced that all arrears on the $38,816,600 5½ per cent. preferred stock are to be paid, together with a dividend of 25c. on the $13,070,625 common stock. This is the first dividend to be paid on the common stock since June 30, 1930. Arrears on the preferred stock up to and including April 1, 1936, amounted to $9,727,300, representing $26.12½ per share, and dividends were resumed on July 1 last. Quarterly payments of $1.37½ are now being made regularly.

Bussey Coal Distillation and Bussey International.—The report of Bussey Coal for year to June 30 last shows a loss of £615, which increases the debit balance, including capital loss of £85,000 on termination of licence, to £306,494. Bussey International loss was £197 and total debit is £1,014,968, including capital loss on termination of licence of £1,001,000. Directors consider that companies' balance sheets cannot be allowed to remain in present form, and that before end of current financial year companies must be drastically reconstructed.

British Emulsifiers.—The statutory report states that the total number of shares allotted is 700,000 ordinary shares of 2s. each. Of shares so allotted 500,000 have been allotted for cash at par and remaining 200,000 have been allotted as fully paid as part of consideration for sale of business and assets of British Emulsifiers, Ltd. (old company). Total amount of cash received by company in respect of 500,000 shares allotted for cash at par was £50,000. Receipts and payments from September 15, 1936, are as follows: Receipts: In respect of shares allotted, 500,000 of 2s. each at par, £50,000; trading and other receipts, £12,177. Payments: Purchase consideration payable in cash: British Emulsifiers, Ltd. (old company), £13,050, redemption of debentures: British Emulsifiers, Ltd. (old company), £10,000; purchase of patents, registered design and trade marks from B. Harding, Ltd., £12,000; investment: National Building Society, £8,000; trading and other payments, £11,889; balance of cash at bank and in hand, £7,238.

Forthcoming Events

LONDON.

Dec. 14.—Institution of the Rubber Industry. (London and District Section.) "Industrial Research, with Special Reference to the Rubber Industry." A. Healey. 7.30 p.m. British Empire Club, 12 St. James's Square, London.

Dec. 15.—Royal Institution of Great Britain. "Chemical Messengers of the Body in Health and Disease." Professor E. Mellanby. 5.15 p.m. 21 Albemarle Street, London.

Dec. 16.—Institution of Chemical Engineers. "Chemical Engineering in the Pulp and Paper Industries, with special reference to Esparto Mills." Dr. Julius Grant. 6 p.m. Rooms of the Chemical Society, Burlington House, Piccadilly, London.

Dec. 16.—Electrodepositors' Technical Society. "Rectification of Acid Copper Solutions." E. A. Ollard. 8.15 p.m. Northampton Polytechnic Institutte, St. John Street, Clerkenwell, London.

Dec. 16.—Royal Society of Arts. "The Development of Crystal Analysis." Sir William Bragg. 8.30 p.m. John Street, Adelphi, London.

Dec. 17.—Chemical Society. "The Kinetics of Bromine Addition." Professor P. W. Robertson, N. T. Clare, K. J. McNaught and G. W. Paul. "Decomposition Reactions of the Aromatic Diazo-Compounds. Part I. Evidence for Non-Ionic Reaction." Dr. W. A. Waters. "The Structure of the Carboxyl Group. A Quantitative Investigation of Oxalic Acid Dihydrate by Fourier Synthesis from the X-ray Crystal Data." Dr. J. M. Robertson and Miss I. Woodward. 8 p.m. Burlington House, Piccadilly, London.

Dec. 18.—Royal Institution of Great Britain. "Optical Contact." Lord Rayleight. 9 p.m. 21 Albemarle Street, London.

Dec. 18, 6 to 9 p.m., and **Dec. 19,** 4 to 9.30 p.m.—Borough Polytechnic. Exhibition of students' work. Borough Road, London.

BIRMINGHAM.

Dec. 15.—Institute of Metals (Birmingham Section). "Metallurgical Problems in the Chemical Industry." N. P. Inglis. 7 p.m. James Watt Memorial Institute, Birmingham.

EDINBURGH.

Dec. 15.—Society of Chemical Industry and Institute of Chemistry (Edinburgh and East of Scotland Sections) and Institute of Brewing (Scottish Section). Paper on biochemical subject. H. Lloyd Hind. 7.30 p.m. North British Station Hotel, Princes Street, Edinburgh.

GLASGOW.

Dec. 14.—Institute of Metals. (Scottish Section). "Metal Spraying by the Wire Process." W. E. Ballard. 7.30 p.m. Rooms of the Institution of Engineers and Shipbuilders in Scotland, 39 Elmbank Crescent, Glasgow.

Dec. 17.—Institute of Vitreous Enamellers. (Scottish Section). "Enamels for Wet Coating Cast-Iron." J. G. Keith. 7.30 p.m. Royal Technical College, Glasgow.

HULL.

Dec. 15.—Hull Chemical and Engineering Society. Presidential Address: "Tinplate." A. T. Wakelin. 7.45 p.m. Room 57, Municipal Technical College, Park Street, Hull.

LIVERPOOL.

Dec. 16.—British Association of Chemists (Liverpool Section). Supper and Social Evening. 7.15 p.m. Angel Hotel, Liverpool.

MANCHESTER.

Dec. 15.—Manchester Literary and Philosophical Society. "X-ray Analysis of Aluminium Alloys." A. J. Bradley. 5.30 p.m. Lecture Room of the Literary and Philosophical Society, 36 George Street, Manchester.

Dec. 16.—Institute of Fuel and Institution of Petroleum Technologists (Northern Branch). "High Performance Fuels." H. C. Tett. 7 p.m. Constitutional Club, St. Ann's Street, Manchester.

Dec. 18.—Society of Dyers and Colourists (Manchester Section) and Manchester Literary and Philosophical Society (Chemical Section). Ordinary meeting. 7 p.m. Lecture Room of the Literary and Philosophical Society, 36 George Street, Manchester.

NEWCASTLE-UPON-TYNE.

Dec. 18.—Institute of Chemistry (Newcastle-upon-Tyne and North-East Coast Section) and Society of Chemical Industry. Address by Dr. J. T. Dunn. Newcastle-upon-Tyne.

Dec. 19.—Institute of Metals (North-East Coast Section) and Institute of British Foundrymen (Newcastle Branch). "Refractories for Foundry Purposes." P. B. Robinson. 7.30 p.m. Electrical Engineering Lecture Theatre, Armstrong College, Newcastle-upon-Tyne.

ST. HELENS.

Dec. 16.—Society of Glass Technology. "The Bursting Pressure Test for Glass Bottles." A. Cousen. "Notes on Annealing Lehrs." C. J. Peddle. "Sand Blasting and Other Processes for Decorating Glass." S. Pollitzer. 2 p.m. Canteen of Pilkington Brothers, Ltd., St. Helens. (Preceded by visits to works).

STOKE-ON-TRENT.

Dec. 14.—Ceramic Society (Pottery Section). "Question Box." 7.30 p.m. North Staffordshire Technical College, Stoke-on-Trent.

STOURBRIDGE.

Dec. 14.—Society of Glass Technology (Midlands Section). "Empire Glassmaking." Professor W. E. S. Turner. 7.30 p.m. Talbot Hotel, Stourbridge.

New Companies Registered

Tees Bottle Works, Ltd., Bridge Road, Stockton-on-Tees.—Registered December 1. Nominal capital £5,000. To acquire the business of a glass bottle manufacturer now carried on by William Proctor at Bridge Road, Stockton-on-Tees, as "W. Proctor and Co." Directors: Wm. Proctor, A. H. Finch and A. Imeson.

Aluminium and General Plating Co., Ltd., Birmingham Factory Centre, Kings Norton, Birmingham. Registered November 30. Nominal capital £100. Electro platers, enamellers, metal polishers and general metal finishers, manufacturers of and dealers in plant, machinery and chemicals for the various metal finishing trades, etc. Directors: Mrs. Germaine C. Burford and J. Relph.

British Neva-Wet Corporation, Ltd.—Registered November 28. Nominal capital £1,000. Manufacturers of and dealers in chemicals and chemical preparations of all descriptions particularly preparations for the treatment of fabrics and other materials and articles in order to render them moisture repellent. Directors: A. H. Marks, 9 Rodborough Road, Golders Green, N.W.11, and G. S. F. Barham.

Duro Chemical Solvents, Ltd.—Registered November 28. Nominal capital, £700. Cleansing, repairing, renovating, and designing hot and cold water systems, central heating plants, tanks, boilers, drains and sewers, manufacturers of and dealers in cleasing materials and substances of all kinds, etc. Subscribers: Wm. R. Fedrick, 29 Winn Road, Lee, S.E.12 and N. T. Fedrick.

Sylkall, Ltd.—Registered November 5. Nominal capital £1,000. To acquire the business now carried on at Blackburn by Nevill B. W. Cooper, as "Sylkall," and to carry on the business of chemists, druggists, drysalters, oil and colour men, etc. Subscribers: John L. Baxter, "Higher Bank," Adelaide Terrace, Blackburn, and Nevill B. W. Cooper.

Soluble Sulphur, Ltd.—Registered November 28. Nominal capital, £500. Manufacturers of and dealers in medicines, ointments, emollients, lotions, chemicals, gases, drugs, fertilisers, sheep dips, etc. Directors: Victor W. I. Marchand, "Pinehurst," South Ascot, Berks, and A. C. Walton.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Austria.—A firm of general import agents established at Vienna wishes to obtain the representation of United Kingdom manufacturers of oils from oil seeds. (Ref. No. 534.)

Cuba.—An agent established at Santiago de Cuba wishes to obtain the representation of United Kingdom manufacturers or refiners of fish oils and animal fats. (Ref. No. 548.)

Palestine.—A firm of commission agents at Tel Aviv wishes to obtain the representation of United Kingdom suppliers of chemicals (aluminium bromatum, calcium bromatum and heavy chemicals for local industries). (Ref. No. 530.)

Books Received

The Cracking Art in 1935. By Gustav Egloff, Emma E. Crandal and Martha M. Doty. Chicago: Universal Oil Products Co. Pp. 351.

Copper in Chemical Plant. London: Copper Development Association. Pp. 69. Free on application.

Ions in Solution. By R. W. Gurney. London: Cambridge University Press. Pp. 206. 10s. 6d.

Disperse Systems in Gases: Dust, Smoke and Fog. A General Discussion held by The Faraday Society. London: Gurney and Jackson. Pp. 259. 12s. 6d.

British Trade in Northern Europe. London: The Advertising Association. Pp. 134. 5s.